Midwater Fishes Taken in Large Trawls off Newfoundland and Nova Scotia

D.S. McKelvie and R.L. Haedrich
Newfoundland Institute for Cold Ocean Science
Memorial University of Newfoundland
St. John's, Newfoundland A1B 3X7

Issuing Establishment:
Science Branch
Department of Fisheries and Oceans
P.O. Box 5667
St. John's, Newfoundland A1C 5X1

August 1986

Canadian Data Report of Fisheries and Aquatic Sciences No. 607

86-06223/

Canadian Data Report of Fisheries and Aquatic Sciences

Data reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of data reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Data reports are not intended for general distribution and the contents must not be referred to in other publications without prior written authorization from the issuing establishment. The correct citation appears above the abstract of each report. Data reports are abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1–25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26–160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was introduced with the publication of report number 161.

Data reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport statistique canadien des sciences halieutiques et aquatiques

Les rapports statistiques servent à classer et à archiver les compilations de données pour lesquelles il y a peu ou point d'analyse. Ces compilations auront d'ordinaire été préparées à l'appui d'autres publications ou rapports. Les sujets des rapports statistiques reflètent la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports statistiques ne sont pas destinés à une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports statistiques sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 25 de cette série ont été publiés à titre de relevés statistiques, Services des pêches et de la mer. Les numéros 26 à 160 ont été publiés à titre de rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 161.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Data Report of
Fisheries and Aquatic Sciences 607

August 1986

MIDWATER FISHES TAKEN IN LARGE TRAWLS OFF NEWFOUNDLAND AND NOVA SCOTIA

by

D. S. McKelvie and R. L. Haedrich
Newfoundland Institute for Cold Ocean Science
Memorial University of Newfoundland
St. John's, Newfoundland
A1B 3X7

Issuing Establishment:
Science Branch
Department of Fisheries and Oceans
P.O. Box 5667
St. John's, Newfoundland A1C 5X1

(c)Minister of Supply and Services Canada 1986

Cat. No. Fs 97-13/607E ISSN 0706-6465

Correct citation for this publication:

McKelvie, D. S., and R. L. Haedrich. 1986. Midwater fishes taken in large trawls off Newfoundland and Nova Scotia. Can. Data Rep. Fish. Aquat. Sci. 607: iv + 29 p.

CONTENTS

Abstract/Résumé iv

Introduction 1

Materials and Methods 1

Results and Discussion 2

Acknowledgements 3

References 3

ABSTRACT

McKelvie, D. S., and R. L. Haedrich. 1986. Midwater fishes taken in large trawls off Newfoundland and Nova Scotia. Can. Data Rep. Fish. Aquat. Sci. 607: iv + 29 p.

Collections made with large Engels midwater trawls in Slope Water, Gulf Stream and Labrador Current in the northeast Atlantic Ocean off Canada contained 168 species in 104 genera and 56 families of mesopelagic fishes. Of the 26,527 specimens identified, Myctophidae comprised 86.7%, most of which were Benthosema glaciale. Physical data for the 69 collections and numbers of specimens, minimum and maximum lengths, and aggregate weight are given for each species lot. The material is housed at the Huntsman Marine Laboratory and the Royal Ontario Museum (ROM).

RÉSUMÉ

McKelvie, D. S., and R. L. Haedrich. 1986. Midwater fishes taken in large trawls off Newfoundland and Nova Scotia. Can. Data Rep. Fish. Aquat. Sci. 607: iv + 29 p.

Les récoltes faites à l'aide de gros chaluts mésopélagiques Engels dans les eaux de la pente continentale, dans le Gulf Stream et dans le courant du Labrador comprenaient 168 espèces réparties en 104 genres et 56 familles de poissons mésopélagiques. Des 26,527 spécimens identifiés, les myctophidés constituaient 86,7% d'entre eux, dont la plupart appartenaient à l'espèce Benthosema glaciale. On donne pour chaque lot d'espèces les données physiques concernant les 69 récoltes et le nombre de spécimens, les longueurs minimales et maximales et le poids global. Le matérial est gardé au Laboratoire Huntsman des sciences marines et au Musée royal de l'Ontario (MRO).

INTRODUCTION

The mesopelagic fish fauna off Canada's east coast is not well documented. Some samples have been taken, but these are few and published reports deal primarily with lanternfish (Halliday 1970, Zurbrigg and Scott 1972). Midwater fish data for this region have been used to make faunal comparisons across presumed physical oceanographic boundaries (Jahn and Backus 1976, Backus et al. 1977).

The pelagic environment is difficult to sample because of the inability to make adequate direct observations. What is known comes from samples using many different types of gear, all of which bias the catch in unpredictable ways. Each sampling device gives a different "window" into the pelagic environment (Robison 1972, Angel 1977).

What gear gives the best "window", i.e. that which best approximates reality? With regard to an accurate representation of species composition in an assemblage, two questions must be addressed: 1) is the gear catching everything that is present and across all size ranges, and 2) are patchy distributions biasing the abundance relationships among the species present?

Large nets decrease net avoidance and therefore increase the capture of rare fish as well as larger individuals of the more common species (Harrisson 1967, Willis and Pearcy 1982, Kashkin and Parin 1983, Pearcy 1983b). Smaller nets tend to catch only the more abundant species (McGowan 1971). Simulation and field studies have shown a reduction in bias due to patchiness for samples from large nets (Wiebe and Holland 1968, Wiebe 1971). Angel et al. (1982) found that an RMT 8 sample (classified as a medium size net; Pearcy 1983a) was an order of magnitude too small to assess the midwater community accurately.

Though the advantages of large nets are known, very few studies actually use them. Most oceanographic research vessels are unable to set and retrieve such gear because of inadequate deck space and winches, and few vessels of any kind are equipped to trawl with large nets to depths greater than 1000m (Pearcy 1983a). Opening-closing devices have not been designed for the very large nets. Fasham and Angel (1975) argue for the use of such devices because water masses, and therefore faunas, may overlap at depth. For distributional studies, only Brandt (1981) and Griffiths and Brandt (1983a, 1983b) in their studies around eddies, and Harrisson (1967), Taylor (1968) and Krefft (1974) have used large Engels midwater trawls. Other large trawls, such as the Cobb 70x80, have also been used (Berry and Perkins 1966).

The purpose of this report is to document collections of mesopelagic fishes taken with large commercial midwater trawls off Canada's east coast. These data form the basis of two reports, one a comparison of faunas from differing water masses (McKelvie 1985a) and another describing the fish fauna of the Newfoundland Basin (McKelvie 1985b).

MATERIALS AND METHODS

Engels 80-630 midwater trawls were used for collection of the present samples. These nets are very large, and have a mouth opening of approximately 600m² (Brandt 1981, Kashkin and Parin 1983). Mesh size in the wings is graded, ranging from 8.3cm stretched mesh near the headrope to 10.2cm stretched mesh near the codend, with a codend liner of 2mm stretched mesh. A disadvantage of these large nets was found during Gadus Atlantica Cruise 62 (GA62). In the very rough seas encountered during this cruise, a number of large trawls were torn beyond repair. Brandt (1981) reported similar problems during his sampling. For the remainder of samples during GA62, a smaller Sputnik 1600 trawl (43m headrope, mesh in codend 40mm with 2mm lining) was substituted.

Collections were obtained from four cruises, Belogorsk 79-03 (Mar. 28/79 - Apr. 13/79), Belogorsk 79-04 (Apr. 27/79 - May 4/79), Gadus Atlantica 51 (May 1981), and Gadus Atlantica 62 (Feb. 21/82 - Mar. 7/82). A total of 69 collections were made (Table 1, Figure 1). All tows were approximately one half hour at fishing depth. Three depth strata were sampled: 100m (night only), 500m and 1000m. No opening-closing devices were used.

Hydrographic data were collected at the beginning of each tow. Reversing bottles were used on the Belogorsk and Gadus Atlantica 62 cruises and a conductivity-temperature-depth probe (CTD) was used on Gadus Atlantica 51. Expendable bathythermographs (XBT) were also used on Gadus Atlantica 62. Using these data, samples were classified by their 200m temperature as Northern Sargasso Sea (>17.5°C), Gulf Stream (15-17.5°C), Slope Water (9-15°C), or Newfoundland Basin (<9°C) (Worthington 1964, Jahn and Backus 1976). Temperature and salinity profiles were plotted for individual transects.

Specimens were identified to species and minimum and maximum standard length were recorded for each species lot (total length for eels). For some collections all fish were measured and weighed. The following references aided in making identifications: Alepocephalidae (Markle 1977), Anoplogasteridae (Woods and Sonoda 1973), Astronesthidae and Idiacanthidae (Gibbs 1964a, b), Bathylagidae, Argentinidae and Opisthoproctidae (Cohen 1964), Bregmacerotidae (D'Ancona and Cavinato 1965), Caristiidae (Scott et al. 1970), Ceratiidae, Linophyrinidae and Oneirodidae (Bertelsen 1951) and Oneirodidae (Pietsch 1974), Chauliodontidae, Malacosteidae, and Stomiatidae (Morrow 1964a, b, c), Chiasmodontidae (Leim and Scott 1966), Diretmidae (Woods and Sonoda 1973, Post 1976), Evermannellidae (Johnson 1982), Gonostomatidae (Grey 1964), Macrouridae (Marshall and Iwamoto 1973), Melamphaidae (Ebeling and Weed 1963), Melanostomiatidae (Morrow and Gibbs 1964), Myctophidae (Nafpaktitis et al. 1977), Nemichthyidae (Nielsen and Smith 1978), Paralepididae (Rofen 1966), Saccopharyngidae and Eurypharyngidae (Goode and Bean 1896), Scopelosauridae (Notosudidae) (Bertelsen et al 1976), Searsidae (Parr 1960), Serrivomeridae (Beebe and Crane 1936), Sternoptychidae (Schultz 1964, Baird 1971), and Stromateidae, Nomeidae and Centrolophidae (Haedrich 1967).

RESULTS AND DISCUSSION

Two transects illustrate the hydrographic properties for the four cruises (Figure 2). Transect A-B, from 1979, is through the Slope Water and across the Gulf Stream. Transect C-D, from 1981, runs east-west from the Grand Banks, through the Newfoundland Basin, to the North Atlantic Current. Temperature and salinity profiles are shown for each transect (Figures 3 to 6).

Two fronts are evident in the temperature and salinity profiles in 1979, one between stations 52 and 53 and one between stations 55 and 56 (transect A-B, Figures 3 and 4). Most of the profile contains Slope Water, with the Gulf Stream to the right at the southern end of transect. Slope Water temperatures at 200m ranged from 9 to 15°C. Mixing is suggested by the bending of isotherms and isohalines. The vertical displacement of the 12°C isotherm on the Slope Water side of the Gulf Stream shows that interleaving of water is occurring along the front. A second, southwestward flowing current carrying cooler, less saline water is evident in the northern part of the transect. Adjacent profiles show this current becoming warmer and more saline as it moves west. Other profiles from samples in this area show similar characteristics.

The second transect, C-D, runs along 45°N latitude from the edge of the continental shelf off Newfoundland to an area south of the Flemish Cap (Figure 1). Two fronts are evident in both the temperature (Figure 5) and salinity (Figure 6) profiles, one between stations 1/2 and 3/4 and the second between stations 9/10 and 11. The Labrador Current runs south along the continental shelf and the North Atlantic Current runs north at the eastern edge of the transect. The front bounding the Labrador Current to the east does not extend to great depth. Most of the profile shows relatively uniform temperature and salinity at depths greater than 200m.

The two transects have interesting similarities. The first transect (Figures 3 and 4) is warmer and more saline, but both transects contain two fronts at their extremes with an area of mixing between. Figure 3 shows evidence for stratification whereas Figure 5, representing the Newfoundland Basin, is uniformly cold. The North Atlantic Current from where the 14-16°C isotherm reaches the surface (Figure 5) is as strong as the Gulf Stream front, where the 18-20°C isotherm reaches the surface (Figure 3).

Table 2 lists the species captured from the large trawls. A total of 26,527 specimens from 168 species, 104 genera and 56 families were identified. Myctophids dominated by number (86.7%). Other families represented included Gonostomatidae (5.7%), Stomiatidae (1.3%), Sternoptychidae (1.1%), Bathylagidae (1.1%), Chauliodontidae (1.0%), Paralepididae and Serrivomeridae (each 0.4%), Melamphaidae (0.3%) and Melanostomiatidae, Diretmidae, Malacosteidae and Scopelosauridae (each 0.1%). Myctophids dominated in 65 collections, and gonostomatids were dominant in the other 4 samples.

There were differences in species composition between the different water masses. The Slope Water samples yielded the greatest number of species in most families (Table 3). The numerically most abundant species from each area are listed in Table 4.

Comparisons of catches from the Slope Water and Gulf Stream with previously published reports (Jahn and Backus 1976, Backus et al 1977) show little difference in species composition. The Slope Water is probably an ecotone between waters of the Newfoundland Basin and the Gulf Stream where species composition changes gradually over broad areas rather than abruptly, at water mass boundaries (McKelvie 1985a).

ACKNOWLEDGEMENTS

Thanks to E. Dawe and J. Anderson, Department of Fisheries and Oceans (DFO), St John's, for making participation on Gadus Atlantica cruises possible. Specimens from the Belogorsk cruises were made available by T. Rowell and T. Amaratunga, Invertebrate and Marine Plants Division, DFO, Halifax. Thanks to R. O'Boyle and P. Hurley (DFO, Dartmouth) for their help in obtaining the collections. The specimens were identified during a stay at the Huntsman Marine Laboratory (HML), St. Andrew's, N.B. Thanks to D. Markle and L. Van Guelpen for their help at the HML. Financial support was supplied by a Memorial University Graduate Student Fellowship, a Suncor Fellowship and grants from the Department of Fisheries and Oceans and the Natural Sciences and Engineering Research Council (A-7230).

REFERENCES

Angel, M.V. 1977. Windows into a sea of confusion: sampling limitations to the measurement of ecological parameters in oceanic mid-water environments. pp. 217-248. In N.R. Anderson and B.J. Zahuranec (eds.), Oceanic Sound Scattering Prediction. Marine Science Vol. 5, Plenum Press, N.Y. 859pp.

Angel, M.V., P. Hargreaves, P. Kirkpatrick and P. Domanski. 1982. Low variability in planktonic and micronektonic populations at 1000m depth in the vicinity of 42°N, 17°W; evidence against diel migratory behaviour in the majority of species. Biol. Oceanogr. 1: 287-319.

Backus, R.H., J.E. Craddock, R.L. Haedrich and B.H. Robison. 1977. Atlantic Mesopelagic Zoogeography. Memoir Sears Found. Mar. Res., No. 1, Part 7: 266-286.

Backus, R.H., J.E. Craddock, R.L. Haedrich and D.L. Shores. 1970. The distribution of mesopelagic fishes in the equatorial and western North Atlantic Ocean. J. Mar. Res. 28: 179-201.

Baird, R.C. 1971. The systematics, distribution and zoogeography of the marines silver hatchetfishes [Family Sternoptychidae]. Bull. Mus. Comp. Zool. Harvard 142: 1-129.

Beebe, W. and J. Crane. 1936. Deep-sea fishes of the Bermuda Oceanographic Expeditions. No. 3, Family Serrivomeridae. Zoologica Vol. XX No. 3: 52-102.

Berry, E.H. and H.C. Perkins. 1966. Survey of pelagic fishes of the California Current area. Fish. Bull. 65: 625-682.

Bertelsen, E. 1951. The ceratioid fishes. Ontogeny, taxonomy, distribution and biology. Dana Rep. No. 39.

Bertelsen, E., G. Krefft and N.B. Marshall. 1976. Fishes of the family Notosudidae. Dana Rep. No. 86.

Brandt, S.B. 1981. Effects of a warm-core eddy on fish distributions in the Tasman Sea off east Australia. Mar. Ecol. Prog. Ser. 6: 19-33.

Clarke, R.A., H.W Hill, R.F. Reiniger and B.A. Warren. 1980. Current system south and east of the Grand Banks of Newfoundland. J. Phys. Oceanogr. 10: 25-65.

Cohen, D.M. 1964. Suborder Argentinoidea. Memoir Sears Found. Mar. Res. No. 1 Part 4: 1-70.

Cram, B.S. 1983. The identification and distribution of lanternfish [Family Myctophidae] off Newfoundland and Labrador. B.Sc. Honours Thesis, Biology Dept., Memorial Univ., St. John's, Nfld.

D'Ancona, U. and G. Cavinato. 1965. The fishes of the family Bregmacerotidae. Dana Rep. No. 64.

Ebeling, A.W. and W.H. Weed III. 1963. Melamphaidae III. Systematics and distribution of the species in the bathypelagic fish genus Scopelogadus Vaillant. Dana Rep. No. 60.

Fasham, M.J.R. and M.V. Angel. 1975. The relationship of the zoogeographic distributions of the planktonic ostracods in the north-east Atlantic to the water masses. J. Mar. Biol. Assn. U.K. 55: 739-757.

Gibbs, R.H. 1964a. Family Astronesthidae. Memoir Sears Found. Mar. Res., No. 1, Part 4: 311-350.

Gibbs, R.H. 1964b. Family Idiacanthidae. Memoir Sears Found. Mar. Res., Part 4: 512-522.

Grey, M. 1964. Family Gonostomatidae. Memoir Sears Found. Mar. Res., No. 1 Part 4: 78-240.

Haedrich, R.L. 1967. The stromateoid fishes: systematics and a classification. Bull. Mus. Comp. Zool. Harvard 135: 31-139.

Halliday, R.G. 1970. Growth and vertical distribution of the glacier lanternfish, Benthosema glaciale, in the northwestern Atlantic. J. Fish. Res. Bd. Canada 27 (1): 105-116.

Harrisson, C.H. 1967. On methods for sampling mesopelagic fishes. Symp. Zool. Soc. London 19: 71-126.

Jahn, A. and R.H. Backus. 1976. On the mesopelagic fish faunas of Slope Water, Gulf Stream and northern Sargasso Sea. Deep-Sea Res. 23: 223-234.

Johnson, R.K. 1982. Fishes of the families Evermanellidae and Scopelarchidae: systematics, morphology, interrelationships, and zoogeography. Fieldiana, Zoology, New Ser. No. 12.

Kashkin, N.I. and N.V. Parin. 1983. Quantitative assessment of micronektonic fishes by nonclosing gear (a review). Biol. Oceanogr. 2: 263-288.

Krefft, G. 1974. Investigation on midwater fish in the Atlantic Ocean. Ber. Deutsche Wiss. Komm. Meeresforschung 23: 226-254.

Liem, A.H. and W.B. Scott. 1966. Fishes of the Atlantic Coast of Canada. Bull. Fish. Res. Board Can. 155: 1-485.

Mann, C.R. 1967. The termination of the Gulf Stream and the beginning of the North Atlantic Current. Deep-Sea Res. 14: 337-359.

Markle, D.F. 1977. Alepocephalidae. FAO species identification sheet, Fishing Area 31 [W. Cent. Atlantic].

Marshall, N.B. and T. Iwamoto. 1973. Family Macrouridae. Memoir Sears Found. Mar. Sci., No. 1, Part 6: 624-663.

McGowan, J.A. 1971. Oceanic biogeography of the Pacific. pp. 3-74. In B.M. Funnell and W.R. Riedel (eds.), Micropaleontology of Oceans. Cambridge Univ. Press, London.

McKelvie, D.S. 1985a. The discreteness of pelagic faunal regions. Mar. Biol. 88: 125-133.

McKelvie, D.S. 1985b. The mesopelagic fish fauna of the Newfoundland Basin. Can. J. Zool. 63: 2176-2182.

Morrow, J.E. 1964a. Family Chauliodontidae. Memoir Sears Found. Mar. Res. No. 1 Part 4: 274-289.

Morrow, J.E. 1964b. Family Malacosteidae. Memoir Sears Found. Mar. Res. No. 1 Part 4: 523-549.

Morrow, J.E. 1964c. Family Stomiatidae. Memoir Sears Found. Mar. Res. No. 1 part 4: 290-310.

Morrow, J.E. and R.H. Gibbs. 1964. Family Melanostomiatidae. Memoir Sears Found. Mar. Res. No. 1 Part 4: 351-511.

Nafpaktitis, B.G., R.H. Backus, J.E. Craddock, R.L. Haedrich, B.H. Robison and C. Karnella. 1977. Family Myctophidae. Memoir Sears Found. Mar. Res. No. 1 Part 7: 13-258.

Nielsen, J.G. and D.G. Smith. 1978. The eel family Nemichthyidae [Pisces, Anguilliformes]. Dana Rep. No. 88.

Parr, A.E. 1960. The fishes of the family Searsidae. Dana Rep. No. 51.

Pearcy, W.G. 1983a. Preface: SCOR symposium on methods of sampling micronekton. Biol. Oceanogr. 2: 105-131.

Pearcy, W.G. 1983b. Quantitative assessment of the vertical distribution of micronektonic fishes with opening/closing midwater trawls. Biol. Oceanogr. 2: 289-310.

Petrie, B. and C. Anderson. 1983. Circulation of the Newfoundland continental shelf. Atmosphere-Ocean 21: 207-226.

Pietsch, T.W. 1974. Osteology and relationships of ceratioid anglerfishesof the family Oneirodidae, with a review of Oneirodes Lutken. Bull. Nat. Hist. Mus. Los Angeles County Museum, No. 18.

Robison, B.H. 1972. Distribution of the midwater fishes of the Gulf of California. Copeia 1972: 448-461.

Rofen, R.R. 1966. Paralepididae. Memoir Sears Found. Mar. Res. No. 1 Part 5: 205-461.

Schultz, L.P. 1964. Family Sternoptychidae. Memoir Sears Found. Mar. Res. No. 1 Part 4: 241-273.

Scott, W.B., A.C. Kohler and R.E. Zurbrigg. 1970. The manefish, Caristius groenlandicus Jensen [Percomorphi: Caristiidae], in Atlantic waters off Canada. J. Fish. Res. Board Can. 27: 174-179.

Taylor, F.H. 1968. The relationship of midwater trawl catches to sound scattering layers off the coast of northern British Columbia. J. Fish. Res. Board Can. 25: 457-472.

Wiebe, P.H. 1971. A computer model study of zooplankton patchiness and its effects on sampling error. Limnol. and Oceanogr. 16: 29-38.

Wiebe, P.H. and W.R. Holland. 1968. Plankton patchiness: effects on repeated tows. Limnol. and Oceanogr. 13: 315-321.

Willis, J.M. and W.G. Pearcy. 1982. Vertical distribution and migration of fishes of the lower mesopelagic zone off Oregon. Mar. Biol. 70: 87-98.

Woods, L.P. and P.M. Sonoda. 1973. Order Berycomorphi [Beryciformes]. Memoir Sears Found. Mar. Res. 6: 263-395.

Worthington, L.V. 1964. Anomalous conditions in the Slope Water area in 1959. J. Fish. Res. Bd. Can. 21:327-333.

Zurbrigg, R.E. and W.B. Scott. 1972. Evidence for expatriate populations of the lanternfish Myctophum punctatum in the northwest Atlantic. J. Fish. Res. Bd. Can. 29: 1679-1683.

Table 1. Station data for large midwater trawl collections off eastern Canada. The station identifier is for ease of reference to the chart, Figure 1.

Collection Number	Station Identifier	Cruise[a]	North Latitude	West Longitude	Date (D/M/Y)	Start Time (local)	Maximum Depth (m)	200-m Temperature (°C)	Gear[b]
966	1	GA51	45° 00'	48° 28'	20/05/81	0730	512	2.2	EMT
967	2	GA51	44° 59'	48° 25'	20/05/81	0925	915	2.2	EMT
968	3	GA51	45° 00'	47° 28'	20/05/81	1447	457	4.5	EMT
969	4	GA51	44° 59'	47° 27'	20/05/81	1617	1010	4.5	EMT
970	5	GA51	45° 00'	46° 29'	20/05/81	2045	489	4.1	EMT
971	6	GA51	45° 00'	46° 26'	20/05/81	2200	1018	4.1	EMT
972	7	GA51	45° 01'	45° 30'	21/05/81	0740	517	5.1	EMT
973	8	GA51	45° 02'	45° 30'	21/05/81	0903	1132	5.1	EMT
974	9	GA51	45° 01'	44° 31'	21/05/81	1456	457	5.2	EMT
975	10	GA51	45° 01'	44° 32'	21/05/81	1615	775	5.2	EMT
976	11	GA51	45° 04'	43° 31'	21/05/81	2220	409	14.5	EMT
1102	12	GA62	41° 27'	56° 01'	21/02/82	2128	100	12.8	EMT
1103	13	GA62	41° 17'	56° 03'	22/02/82	0210	100	12.0	EMT
1106	14	GA62	40° 48'	56° 00'	22/02/82	2050	100	11.9	EMT
1107	15	GA62	40° 38'	56° 00'	23/02/82	0133	100	12.2	EMT
1108	16	GA62	40° 27'	56° 03'	23/02/82	0523	100	13.3	EMT
1112	17	GA62	39° 47'	56° 00'	25/02/82	0145	100	14.2	SBT
1116	18	GA62	39° 18'	56° 01'	28/02/82	0100	100	14.5	SBT
1117	19	GA62	39° 08'	56° 01'	28/02/82	0405	100	14.3	SBT
1122	20	GA62	37° 21'	55° 00'	01/03/82	2000	100	16.9	SBT
1123	21	GA62	37° 41'	55° 00'	02/03/82	0040	100	17.0	SBT
1124	22	GA62	38° 01'	55° 00'	02/03/82	0514	100	17.0	SBT
1128	23	GA62	39° 00'	54° 00'	03/03/82	2131	100	17.3	SBT
1129	24	GA62	38° 40'	54° 00'	04/03/82	0235	100	17.0	SBT
1133	25	GA62	37° 41'	53° 00'	05/03/82	2348	100	16.7	SBT
1134	26	GA62	38° 00'	53° 00'	05/03/82	0428	100	16.7	SBT
1138	27	GA62	39° 21'	53° 00'	05/03/82	2152	100	16.9	SBT
1139	28	GA62	39° 40'	53° 00'	06/03/82	0220	100	17.4	SBT
1143	29	GA62	40° 10'	53° 00'	06/03/82	2335	100	13.7	SBT
1144	30	GA62	40° 31'	53° 00'	07/03/82	0339	100	13.8	SBT
1149	31	GA62	41° 20'	53° 00'	07/03/82	2212	100	12.3	SBT
6809	32	BE03	40° 54'	60° 05'	28/03/79	1421	500	13.6	EMT
6814	33	BE03	40° 51'	59° 21'	29/03/79	0245	500	14.6	EMT
6824	34	BE03	39° 40'	58° 31'	30/03/79	1455	500	17.9	EMT
6829	35	BE03	39° 01'	56° 09'	31/03/79	1018	500	17.4	EMT
6837	36	BE03	39° 44'	56° 59'	01/04/79	0114	100	17.9	EMT
6854	37	BE03	39° 44'	56° 59'	01/04/79	2343	500	17.9	EMT
6855	38	BE03	39° 44'	56° 59'	01/04/79	0711	500	17.9	EMT
6856	39	BE03	39° 44'	56° 59'	01/04/79	1055	500	17.9	EMT
6857	40	BE03	39° 43'	56° 58'	01/04/79	1455	500	17.9	EMT
6858	41	BE03	39° 44'	56° 59'	01/04/79	1859	500	17.9	EMT
6870	42	BE03	41° 08'	58° 38'	03/04/79	1010	500	13.8	EMT
6875	43	BE03	41° 48'	59° 28'	03/04/79	2211	500	13.6	EMT
6880	44	BE03	42° 27'	58° 27'	04/04/79	1722	500	11.8	EMT
6885	45	BE03	41° 44'	57° 38'	05/04/79	0705	500	13.4	EMT
6890	46	BE03	41° 01'	56° 48'	05/04/79	2106	500	13.8	EMT
6895	47	BE03	40° 17'	55° 58'	06/04/79	1121	500	13.4	EMT
6897	48	BE03	39° 32'	55° 06'	06/04/79	2226	100	14.1	EMT
6900	49	BE03	39° 32'	55° 06'	07/04/79	0027	500	14.1	EMT
6905	50	BE03	38° 49'	54° 18'	07/04/79	1323	500	14.1	EMT
6907	51	BE03	38° 05'	53° 28'	07/04/79	2345	500	17.0	EMT
6915	52	BE03	39° 26'	53° 13'	08/04/79	2005	500	15.7	EMT
6920	53	BE03	40° 12'	54° 06'	09/04/79	1000	500	12.3	EMT
6925	54	BE03	40° 57'	55° 00'	09/04/79	2240	500	11.8	EMT
6930	55	BE03	41° 40'	55° 49'	10/04/79	0940	500	11.4	EMT
6935	56	BE03	42° 02'	56° 15'	10/04/79	2115	500	11.1	EMT
6940	57	BE03	42° 22'	56° 40'	11/04/79	0756	500	----	EMT
6946	58	BE03	43° 40'	56° 31'	12/04/79	0222	500	9.3	EMT
6951	59	BE03	43° 06'	55° 55'	12/04/79	1148	500	5.7	EMT
6953	60	BE03	42° 12'	54° 55'	12/04/79	2335	100	10.2	EMT
6956	61	BE03	42° 12'	54° 55'	13/04/79	0143	500	10.2	EMT
6960	62	BE03	41° 29'	54° 06'	13/04/79	1355	500	12.2	EMT
6984	63	BE04	41° 12'	49° 20'	27/04/79	0240	100	8.2	EMT
6988	64	BE04	42° 07'	46° 22'	30/04/79	0238	100	14.7	EMT
6994	65	BE04	44° 11'	45° 57'	01/05/79	1905	100	7.7	EMT
6996	66	BE04	44° 16'	45° 21'	02/05/79	0210	100	8.2	EMT
6998	67	BE04	44° 40'	47° 53'	02/05/79	1937	100	5.7	EMT
7002	68	BE04	45° 36'	44° 35'	03/05/79	1919	100	9.0	EMT
7004	69	BE04	45° 06'	43° 58'	04/05/79	0203	100	11.0	EMT

[a] GA = Gadus Atlantica
BE = Belogorsk

[b] EMT = Engels midwater trawl
SBT = Sputnik bottom trawl

Table 2. Species data for midwater fishes taken in large midwater trawls off eastern Canada. Arrangement is alphabetical by family. Following each species name, the entries are: Column 1, collection number (data in Table 1); Column 2, number of specimens; Column 3, maximum length of specimens, mm; Column 4, minimum length of specimens, mm; Column 5, aggregate weight of specimens, gm.

Material collected by BELOGORSK (Coll. 6809-7004) is kept in the Huntsman Marine Laboratory, St. Andrews, NB; that from the GADUS ATLANTICA (Coll. 966-1149), with few exceptions, is now in the Royal Ontario Museum (ROM), Toronto.

ALEPOCEPHALIDAE
XENODERMICHTHYS COPEI
970 1 81.7 81.7 4.1

ANARHICHADIDAE
ANARHICHAS DENTICULATUS
6998 1 26.4 26.4

ANGUILLIDAE
ANGUILLA ANGUILLA
976 3 58.2 55.0 2.0
6915 1 ---- ----

ANOPLOGASTERIDAE
ANOPLOGASTER CORNUTA
969 1 128.4 128.4 77.6
973 1 120.6 120.6 78.0
6946 1 113.2 113.2

APOGONIDAE
HOWELLA BRODIEI
1107 1 28.4 28.4
1112 1 39.7 39.7
6854 1 ---- ----
6858 1 ---- ----
6915 1 70.0 70.0
6925 1 91.0 91.0
6994 1 38.2 38.2
6996 1 42.2 42.2
7002 2 47.3 43.6
7004 1 48.7 48.7

ARGENTINIDAE
NANSENIA GROENLANDICA
976 4 83.8 66.8 10.2
NANSENIA OBLITA
6915 2 35.0 35.0

ASTRONESTHIDAE
ASTRONESTHES LEUCOPOGON
6951 1 87.3 87.3
ASTRONESTHES SIMILIS
1139 1 94.3 94.3 6.1
BOROSTOMIAS ANTARCTICUS
967 4 98.9 79.9 15.4
969 1 89.6 89.6 4.1
970 1 172.1 172.1 39.6
971 3 207.8 203.9 191.8
973 1 213.3 213.3 55.4

BATHYLAGIDAE
BATHYLAGUS BERICOIDES
976 3 135.9 99.6 50.9
BATHYLAGUS COMPSUS
1102 1 35.2 35.2 0.2
1106 11 93.0 54.5
1107 12 99.5 33.8
1112 2 122.5 65.2
6837 6 47.7 37.8
6854 3 85.8 25.6
6858 2 52.1 30.3
6900 3 140.3 140.3
6915 3 145.0 35.1
6925 3 134.1 30.5
6946 6 130.5 32.0
6996 3 33.4 26.4
BATHYLAGUS EURYOPS
967 1 82.2 82.2 4.9
969 66 144.9 33.1 329.8
970 36 127.0 34.0 122.3
971 32 166.0 51.2 483.5
973 28 148.1 34.9 304.0
975 47 80.3 30.8 84.2
6875 1 121.6 121.6
6925 1 86.0 86.0
6935 1 117.0 117.0
6946 3 115.3 82.2
6956 1 154.0 154.0
BATHYLAGUS GREYAE
976 9 49.1 29.8 4.9
1112 1 101.0 101.0
6994 1 121.0 121.0
BATHYLAGUS LONGIROSTRUS
1103 1 78.7 78.7 2.5
1108 5 158.8 81.1 35.6

BRAMIDAE
PTERYCOMBUS BRAMA
1112 1 56.1 56.1 4.2

BREGMACEROTIDAE
BREGMACEROS ATLANTICUS
1108 2 55.9 48.1 1.5
BREGMACEROS SP
1107 1 48.9 48.9
6814 1 27.1 27.1
6837 1 27.2 27.2
6854 1 ---- ----

CARISTIIDAE
CARISTIUS GROENLANDICUS
971 1 143.6 143.6 113.8

CERATIIDAE
CERATIAS HOLBOELLI
969 1 70.9 70.9 23.3
CRYPTOPSARAS COUESI
6837 1 16.2 16.2
6895 1 ---- ----
6897 1 14.2 14.2
6951 1 68.5 68.5
6960 1 70.0 70.0

CHAULIODONTIDAE
CHAULIODUS DANAE
6905 1 92.6 92.6
CHAULIODUS SLOANI
967 7 210.3 130.5 115.1

968	1	166.9	166.9	7.5
969	15	243.3	111.8	333.6
970	9	224.8	116.2	146.6
971	16	240.9	79.7	381.6
972	7	193.0	84.3	71.8
973	8	237.7	71.2	110.3
974	10	166.2	52.1	54.2
975	28	255.6	77.2	536.5
976	11	226.3	63.7	139.0
1102	3	74.5	62.5	2.0
1106	4	80.1	46.3	
1107	2	72.5	57.3	
1149	1	57.3	57.3	0.4
6829	1	51.8	51.8	
6837	3	69.2	48.9	
6854	6	90.6	38.9	
6855	1	42.2	42.2	
6857	1	50.5	50.5	
6858	7	175.5	43.2	
6875	5	195.0	90.4	
6880	17	139.4	34.8	
6885	1	42.8	42.8	
6890	3	122.1	52.8	
6895	5	118.3	51.7	
6897	1	61.1	61.1	
6900	10	112.0	37.4	
6905	1	89.8	89.8	
6915	8	46.6	33.0	
6920	14	126.4	36.0	
6925	2	151.7	36.9	
6930	14	219.0	48.4	
6935	8	132.0	46.5	
6940	1	129.6	129.6	
6946	4	208.0	56.7	
6951	7	165.0	50.2	
6953	2	105.1	81.4	
6956	4	175.0	76.1	
6960	2	48.6	46.8	
6994	5	104.0	58.6	
6996	2	110.6	82.1	
7004	2	90.6	72.2	

CHIASMODONTIDAE

CHIASMODON NIGER				
970	1	100.5	100.5	7.4
971	1	75.7	75.7	4.5
975	1	76.2	76.2	3.3
6858	1	34.6	34.6	
6875	1	100.4	100.4	
6935	1	75.1	75.1	

CONGRIDAE

ARIOSOMA SP				
6854	3	----	----	
CONGER SP				
6809	1	----	----	
6855	1	----	----	
6856	1	----	----	
6857	1	----	----	
6885	1	----	----	
HILDEBRANDIA SP				
6824	1	----	----	
6870	1	----	----	
6895	1	----	----	

DERICHTHYIDAE

DERICHTHYS SERPENTINUS				
969	1	182.9	182.9	6.0
971	1	220.7	220.7	8.8

DIRETMIDAE

DIRETMUS ARGENTEUS				
969	1	95.6	95.6	38.1
974	1	93.5	93.5	28.2
975	6	106.8	58.8	262.3
976	2	92.4	21.0	93.1
6829	2	100.3	98.8	
6856	1	21.6	21.6	
6857	1	21.7	21.7	
6870	1	62.6	62.6	
6875	1	50.3	50.3	
6880	3	62.0	57.6	
6885	2	66.8	61.9	
6895	1	60.8	60.8	
6920	1	66.9	66.9	

EURYPHARYNGIDAE

EURYPHARYNX PELECANOIDES				
973	2	426.2	343.0	45.8

EVERMANELLIDAE

COCCORELLA ATRATA				
6837	3	31.0	21.2	
6854	1	37.8	37.8	
6915	1	39.9	39.9	
EVERMANNELLA BALBO				
6946	1	67.9	67.9	

GADIDAE

PHYCIS CHESTERI				
1107	1	27.0	27.0	

GEMPYLIDAE

NEALOTUS TRIPES				
6890	1	94.8	94.8	
NEOEPINNULA ORIENTALIS				
6875	1	47.0	47.0	

GONOSTOMATIDAE

BONAPARTIA PEDALIOTA				
976	3	43.4	32.7	1.2
1107	1	49.0	49.0	
6809	2	55.1	44.8	
6814	18	64.2	44.1	
6824	13	52.8	33.5	
6854	19	66.9	39.0	
6855	41	68.7	27.4	
6856	18	63.1	37.4	

6858	1	46.4	46.4	
6875	2	37.9	33.4	
6885	6	57.2		
6900	9	65.5	34.3	
6905	3	60.0	44.5	
6907	1	38.8	38.8	
6925	3	51.1	39.2	
6960	1	45.0	45.0	
CYCLOTHONE ACCLINIDENS				
6858	2	34.5	25.7	
CYCLOTHONE ALBA				
6858	2	28.9	26.4	
6870	1	24.9	24.9	
6880	3	29.9	21.9	
6895	1	25.0	25.0	
6900	1	27.3	27.1	
6920	1	30.2	30.2	
6935	1	22.2	22.2	
6960	2			
CYCLOTHONE BRAUERI				
973	28	55.2	31.2	6.6
6809	5	26.5	21.0	
6854	16	27.4	15.9	
6855	8	20.1	15.2	
6858	11	31.2	21.7	
6870	17	30.8	9.6	
6875	4	33.0	26.9	
6880	15	28.3	15.5	
6885	41	29.8	21.2	
6895	4	26.4	24.6	
6900	29	30.8	23.8	
6905	2	28.3	23.5	
6915	9	24.4	18.5	
6920	15	31.8	22.0	
6925	11	28.5	20.8	
6935	4	31.4	26.2	
6960	4	33.8	25.2	
CYCLOTHONE MICRODON				
969	30	42.6	25.4	8.7
971	19	54.8	40.3	13.4
6905	3	31.2	20.5	
6946	56	----	----	
6951	91	----	----	
6956	140	39.8	20.6	
CYCLOTHONE PSEUDOPALLIDA				
6858	1	30.3	30.3	
6870	2	31.0	27.6	
6875	4	37.1	28.2	
6885	1	33.3	33.3	
6905	1	37.7	37.7	
6920	3	31.4	21.8	
6925	4	39.3	27.2	
6935	2	----	----	
6953	1	26.2	26.2	
DIPLOPHOS TAENIA				
6854	2	105.6	87.5	
6858	1	122.5	122.5	
GONOSTOMA BATHYPHILUM				
973	2	73.1	72.8	3.3
GONOSTOMA ELONGATUM				
975	2	225.3	205.1	72.9
976	2	158.6	112.8	19.1
1102	4	116.8	65.6	9.5
1103	2	129.7	87.7	6.8
1106	90	107.4	44.2	
1107	61	125.3	23.8	
1108	41	101.4	33.2	24.5
1138	1	26.1	26.1	0.1
1143	4	66.9	35.3	1.7
6837	11	65.2	30.3	
6854	15	227.0	30.9	
6858	2	60.8	45.5	
6875	3	161.0	49.2	
6880	1	145.8	145.8	
6890	4	116.5	53.7	
6895	2	50.8	37.8	
6900	5	175.0	73.3	
6905	1	106.0	106.0	
6915	3	170.0	160.0	
6925	1	140.7	140.7	
6930	1	86.9	86.9	
6935	1	187.0	187.0	
6994	1	102.9	102.9	
6996	2	120.0	94.8	
7002	5	72.0	45.8	
ICHTHYOCOCCUS OVATUS				
976	1	39.3	39.3	1.0
6824	1	24.1	24.1	
6854	3	27.9	21.4	
6855	3	29.0	20.7	
6857	2	24.9	23.8	
6900	5	34.4	19.5	
6925	2	29.4	22.3	
6960	2	29.6	22.8	
MARGRETHIA OBTUSIROSTRA				
976	1	63.4	63.4	4.0
1106	1	26.1	26.1	
6855	1	68.1	68.1	
6856	1	26.0	26.0	
6858	4	40.2	23.4	
6920	1	27.4	27.4	
POLLICHTHYS MAULI				
6824	4	32.3	25.8	
6854	8	36.9	24.0	
6855	1	33.6	33.6	
6858	3	45.0	36.8	
6875	2	36.8	32.6	
6897	2	37.5	25.8	
6915	1	32.3	32.3	
6925	1	26.7	26.7	
VALENCIENNELLUS TRIPUNCTULATUS				
6809	3	22.9	21.5	
6814	3	24.4	24.4	
6824	1	23.0	23.0	
6854	6	29.8	22.0	
6855	3	26.9	20.3	
6856	2	23.9	23.1	
6857	4	24.5	24.1	

6875	3	28.0	25.0	
6880	2	25.3	22.4	
6885	1	29.2	29.2	
6890	1	----	----	
6900	1	----	----	
6920	1	18.9	18.9	
VINCIGUERRIA ATTENUATA				
1102	5	32.2	25.7	1.1
1103	1	27.8	27.8	0.2
1106	58	42.1	23.1	
1107	28	37.5	26.8	
1108	10	35.2	24.5	2.5
1112	3	32.4	31.4	
1134	1	28.3	28.3	
6809	1	35.0	35.0	
6814	17	38.7	28.9	
6824	3	37.4	24.3	
6854	4	35.4	33.4	
6855	2	35.1	34.4	
6856	6	37.5	26.7	
6858	5	42.0	28.3	
6870	3	36.0	35.0	
6875	1	40.7	40.7	
6900	4	38.6	32.7	
6905	4	34.4	17.9	
6915	10	41.8	29.8	
6920	3	43.1	30.3	
6925	7	39.2	20.3	
6960	6	44.9	37.7	
6988	10	42.3	27.1	
7002	4	43.1	34.9	
7004	1	40.3	40.3	
VINCIGUERRIA NIMBARIA				
976	5	43.6	39.1	2.5
1106	1	34.5	34.5	
1112	1	36.3	36.3	
1123	2	37.8	26.6	
1128	1	22.3	22.3	0.1
1129	1	37.8	37.8	0.2
1133	1	36.4	36.4	0.2
1138	1	----	----	
6855	1	23.0	23.0	
6875	1	29.7	29.7	
6897	3	26.8	21.9	
VINCIGUERRIA POWERIAE				
1143	4	31.5	28.9	1.2
1149	1	31.3	31.3	0.3
6855	1	27.0	27.0	
IDIACANTHIDAE				
IDIACANTHUS FASCIOLA				
971	1	201.0	201.0	1.6
6837	1	108.7	108.7	
6988	1	62.4	62.4	
6994	1	139.0	139.0	
LINOPHRYNIDAE				
EDRIOLYCHNUS SCHMIDTI				
969	1	31.1	31.1	3.8
MACRORHAMPHOSIDAE				
MACRORHAMPHOSUS SCOLOPAX				
6854	1	39.3	39.3	
6855	1	54.0	54.0	
MACROURIDAE				
NEZUMIA BAIRDII				
967	1	85.0	85.0	0.5
MALACOSTEIDAE				
ARISTOSTOMIAS LUNIFER				
969	1	130.6	130.6	15.8
6930	1	42.4	42.4	
ARISTOSTOMIAS PHOTODACTYLUS				
6870	1	50.0	50.0	
ARISTOSTOMIAS SP				
6854	2	54.6	35.7	
6905	1	58.6	58.6	
ARISTOSTOMIAS XENOSTOMA				
976	1	98.2	98.2	7.1
MALACOSTEUS NIGER				
969	4	117.3	99.1	42.3
970	1	102.6	102.6	9.0
971	5	187.1	110.8	204.0
975	2	132.8	105.3	28.0
976	1	120.2	120.2	13.4
6930	1	71.4	71.4	
6940	2	89.3	89.3	
6946	3	133.0	106.0	
PHOTOSTOMIAS GUERNEI				
975	2	123.9	100.0	13.9
976	1	77.8	77.8	1.5
6854	1	67.8	67.8	
6858	1	72.3	72.3	
6935	1	74.4	74.4	
6946	1	96.5	96.5	
6956	1	105.9	105.9	
7004	1	42.1	42.1	
MAUROLICIDAE				
MAUROLICUS MUELLERI				
974	1	47.5	47.5	1.0
MELAMPHAIDAE				
MELAMPHAES MICROPS				
969	1	33.6	33.6	0.7
973	2	95.5	26.1	21.6
974	1	99.2	99.2	19.1
1103	2	22.2	16.9	0.3
1108	5	21.5	15.9	0.6
6854	3	20.9	18.6	
6858	1	19.1	19.1	
6858	1	17.3	17.3	
6875	1	49.9	49.9	
MELAMPHAES SUBORBITALIS				
6890	1	60.8	60.8	
MELAMPHAES TYPHLOPS				
6814	2	22.4	22.2	

6858	2	20.8	19.6	
6915	2	21.4	21.2	
POROMITRA	CAPITO			
6814	1	65.8	65.8	
6854	1	19.5	19.5	
6858	1	29.8	29.8	
6875	1	83.2	83.2	
6915	15	71.4	24.3	
6925	2	25.3	22.4	
POROMITRA	MEGALOPS			
969	2	54.5	42.8	3.2
SCOPELOGADUS	BEANII			
970	1	105.7	105.7	24.5
971	4	102.8	94.4	98.6
973	3	109.4	107.1	87.4
1106	1	28.0	28.0	
6814	1	41.5	41.5	
6875	6	63.3	31.3	
6900	1	43.4	43.4	
6925	1	25.0	25.0	
6935	5	48.2	39.0	
6946	4	65.2	29.1	
MELANONIDAE				
MELANONUS	ZUGMAYERI			
6935	1	128.3	128.3	
MELANOSTOMIATIDAE				
BATHOPHILUS	METALLICUS			
7004	1	71.7	71.7	
BATHOPHILUS	PROXIMUS			
6895	1	62.2	62.2	
BATHYPHILUS	METALLICUS			
1129	1	48.5	48.5	0.5
CHIROSTOMIAS	PLIOPTERUS			
1123	1	77.8	77.8	2.0
EUSTOMIAS	ENBARBATUS			
1106	1	92.5	92.5	
1128	1	109.1	109.1	2.0
EUSTOMIAS	FILIFER			
1106	1	----	----	
1128	1	84.2	84.2	0.9
EUSTOMIAS	SP			
1123	1	131.1	131.1	7.0
1129	1	87.3	87.3	0.6
LEPTOSTOMIAS	BERMUDENSIS			
1108	1	107.7	107.7	1.9
MELANOSTOMIAS	SPILORHYNCHUS			
975	3	258.6	235.9	204.1
976	3	259.6	148.2	97.4
1106	9	106.2	62.2	
1107	8	108.1	77.0	
6890	1	111.7	111.7	
6930	1	241.0	241.0	
6988	1	73.5	73.8	
6994	1	140.5	140.5	
MELANOSTOMIAS	DINEMA			
6900	1	67.6	67.6	
PHOTONECTES	MARGARITA			
1106	1	117.4	117.4	
6895	1	38.9	38.9	
6956	1	----	----	
6960	1	58.7	58.7	
7002	1	35.9	35.9	
PHOTONECTES	SP			
6897	1	46.7	46.7	
MOLOIDAE				
MOLA	MOLA			
6854	1	22.8	22.8	
MORIDAE				
SVETOVIDOVIA	SP			
6858	1	20.5	20.5	
6870	10	21.8	21.8	
6885	3	----	----	
6900	3	39.0	25.7	
6930	1	40.9	40.9	
6935	1	31.4	31.4	
MURAENESOCIDAE				
PARAXENOMYSTAX	SP			
6857	1	----	----	
MYCTOPHIDAE				
BENTHOSEMA	GLACIALE			
966	250	66.4	30.9	524.3
967	1623	72.0	72.0	2747.3
968	81	66.6	36.1	184.1
969	728	74.1	28.0	1419.7
970	942	71.6	24.2	1813.3
971	383	68.8	26.1	767.8
972	403	69.1	30.1	854.7
973	664	66.8	26.5	1289.1
974	403	69.5	28.8	966.7
975	166	68.7	28.1	416.2
976	11	56.5	25.2	7.6
1102	268	67.1	35.2	
1103	46	61.9	35.1	
1106	153	----	19.5	
1107	172	61.5	23.8	
1108	43	62.5	36.5	
1112	5	63.1	21.2	4.9
1116	4	40.2	24.3	
1117	2	60.1	47.7	
1143	1	23.2	23.2	0.1
1149	6	56.0	21.8	8.3
6809	14	56.8	20.3	
6814	5	52.0	34.4	
6829	18	45.4	21.6	
6837	2	29.4	20.1	
6854	2	29.7	24.8	
6858	31	66.4	24.0	
6870	32	67.8	22.1	
6875	175	74.0	20.9	
6880	268	68.1	22.4	
6885	72	60.9	21.4	
6890	26	61.3	37.9	

6895	107	68.8	21.6	
6897	6	41.1	19.9	
6900	71	68.7	33.3	
6905	23	56.7	25.0	
6915	9	55.7	23.1	
6920	111	60.9	22.9	
6925	126	65.2	24.2	
6930	38	66.4	25.1	
6935	111	69.4	22.4	
6940	120	64.6		
6946	584	67.2	22.6	
6951	689	62.9	22.8	
6953	184	62.3	24.6	
6956	151	64.6	22.0	
6960	4	63.0	32.0	
6984	17	41.6	25.1	
6988	36	47.9	24.8	
6994	1500	60.9	24.5	
6996	966	62.9	21.2	
6998	486	69.0	25.6	
7002	470	61.0	27.6	
7004	13	55.8	26.9	
BENTHOSEMA SUBORBITALE				
1123	1	24.8	24.8	0.2
1129	1	23.7	23.7	0.1
BOLINICHTHYS INDICUS				
969	1	37.6	37.6	0.7
973	1	37.9	37.9	
976	17	35.6	27.3	8.4
1102	1	38.9	38.9	0.8
1103	2	35.8	32.2	1.2
1106	39	38.7	20.2	
1107	16	39.8	24.6	
1108	34	39.0	23.1	13.8
1112	4	31.1	28.9	1.4
1117	2	31.5	27.7	
1128	15	30.4	19.3	2.7
1129	2	29.1	26.8	0.5
1138	1	----	----	
1139	12	26.6	17.3	1.4
1143	1	24.7	24.7	0.2
6829	2	25.2	19.1	
6837	72	32.2	21.2	
6854	17	32.1	17.8	
6858	11	30.4	22.7	
6875	4	31.4	22.4	
6880	1	25.9	25.9	
6885	12	25.4	20.0	
6890	1	29.9	29.9	
6895	13	32.6	20.4	
6897	5	27.8	22.3	
6900	7	32.4	23.4	
6905	5	32.1	25.1	
6907	2	27.9	23.2	
6915	17	40.5	22.3	
6920	4	25.0	19.6	
6925	5	30.4	24.5	
6930	1	25.7	25.2	
6953	3	27.8	22.3	
6960	19	32.8	19.0	
6984	4	28.1	23.8	
6988	23	33.3	24.4	
6994	1	31.4	31.4	
6996	3	29.9	23.6	
7002	11	41.3	21.9	
7004	7	34.2	29.8	
BOLINICHTHYS SUPRALATERALIS				
975	1	77.7	77.7	8.0
6829	2	34.0	32.3	
6915	2	59.7	36.0	
6920	1	32.9	32.9	
CERATOASCOPELUS MADERENSIS				
1102	58	69.1	27.6	97.2
971	1	54.7	54.7	2.0
972	1	52.4	52.4	1.7
974	10	59.6	48.6	16.7
975	7	66.4	47.6	14.1
976	623	61.6	41.8	1053.9
1103	4	63.1	41.7	7.6
1106	340	62.2	----	
1107	1098	62.4	31.0	
1108	278	65.1	21.4	250.1
1112	90	62.9	22.6	61.4
1116	34	62.6	29.1	27.1
1117	32	63.0	25.6	
1123	1	36.4	36.4	0.5
1124	1	28.5	28.5	0.2
1128	1	65.3	65.3	3.2
1134	3	39.8	36.2	
1143	20	57.6	29.7	13.0
1144	55	50.9	30.1	39.8
1149	141	47.0	26.3	87.8
6809	4	45.6	38.0	
6855	1	37.5	37.5	
6870	1	36.0	36.0	
6875	18	67.4	32.9	
6880	3	50.2	28.9	
6885	14	66.2	38.4	
6890	8	58.3	38.3	
6895	2	50.6	48.7	
6897	5	48.5	42.7	
6900	3	52.9	41.4	
6905	1	48.7	48.7	
6907	1	64.6	64.6	
6915	1	51.9	51.9	
6920	2	40.3	36.0	
6925	77	65.0	30.4	
6946	1	61.3	61.3	
6951	3	----	----	
6953	1	45.5	45.5	
6960	7	50.8	36.7	
6984	1807	67.1	31.7	
6988	69	58.6	41.8	
6994	140	58.4	40.5	
6996	26	65.8	47.8	
6998	1	53.1	53.1	
7002	100	59.9	41.8	
7004	94	57.7	36.6	

CERATOSCOPELUS WARMINGII				
1108	15	55.6	24.6	16.1
1112	1	49.1	49.1	1.2
1116	2	46.8	31.2	1.5
1117	2	41.7	36.2	
1122	22	64.2	33.1	53.9
1123	85	61.4	22.6	84.7
1124	56	55.8	21.2	57.0
1128	14	52.8	25.6	11.2
1129	44	67.3	22.1	51.6
1133	23	53.8	22.2	22.9
1134	31	66.3	22.1	
1138	8	58.7	24.1	10.7
1139	3	69.1	26.5	7.0
1143	1	54.3	54.3	2.1
1144	6	57.6	24.8	9.2
1149	2	38.7	32.8	1.0
6837	10	63.1	29.1	
6854	23	52.7	25.8	
6858	16	50.9	21.8	
6875	1	56.7	56.7	
6890	1	54.0	54.0	
6897	1	54.3	54.3	
6900	3	37.3	31.8	
6907	60	60.1	27.4	
6915	9	57.4	28.7	
6984	2	55.0	38.1	
DIAPHUS BRACHYCEPHALUS				
1108	1	27.9	27.9	0.4
1116	1	27.8	27.8	
1129	1	22.4	22.4	0.2
1144	1	26.3	26.3	0.4
6837	2	25.0	17.4	
6854	4	32.2	24.4	
6856	1	28.4	28.4	
6857	1	39.5	39.5	
6915	1	31.5	31.5	
DIAPHUS DUMERILII				
1112	1	51.2	51.2	1.7
1123	3	44.4	39.9	2.5
1143	1	42.8	42.8	1.0
1144	1	34.1	34.1	0.4
DIAPHUS EFFULGENS				
976	5	82.0	63.8	35.5
1108	2	44.5	38.3	2.3
1122	1	38.8	38.8	1.2
1123	1	37.3	37.3	0.8
1128	7	45.4	27.9	6.5
1139	6	49.1	36.1	7.8
1143	2	49.7	39.4	
6890	1	78.2	78.2	
6897	1	36.4	36.4	
6915	1	36.8	36.8	
DIAPHUS FRAGILIS				
6829	1	48.8	48.8	
DIAPHUS HOLTI				
976	2	47.5	40.9	3.1
DIAPHUS LUCIDUS				
1106	1	56.1	56.1	
1112	1	47.3	47.3	1.6
1128	1	27.8	27.8	0.3
6837	8	30.9	23.7	
6854	5	33.8	23.2	
DIAPHUS METOPOCLAMPUS				
976	5	48.0	23.6	4.5
6870	3	20.6	16.9	
6915	1	46.7	46.7	
6960	1	51.3	51.3	
7002	3	24.4	18.7	
DIAPHUS MOLLIS				
1103	1	37.8	37.8	0.8
1106	1	38.0	38.0	
1108	2	39.1	36.8	1.5
1112	2	36.5	36.3	1.4
1116	1	19.9	19.9	
1117	1	37.5	37.5	
1122	4	33.8	31.2	2.8
1123	5	34.8	25.4	2.1
1124	2	37.1	35.6	1.5
1129	8	37.7	26.8	4.6
1134	1	26.9	26.9	
1138	6	37.2	25.4	3.1
1139	2	37.6	37.0	1.6
1143	4	38.0	34.5	2.8
1144	7	36.6	24.2	2.9
6809	1	34.7	34.7	
6824	3	34.8	29.5	
6837	8	33.9	19.2	
6854	8	39.9	26.9	
6855	4	39.2	23.6	
6856	6	40.6	30.2	
6857	3	37.9	34.0	
6858	1	29.4	29.4	
6870	1	37.4	37.4	
6900	1	41.8	41.8	
6915	2	33.6	28.7	
6960	1	39.0	39.0	
6984	4	43.5	38.3	
DIAPHUS PERSPICILLATUS				
1129	4	40.2	22.1	2.4
1134	1	49.7	49.7	
DIAPHUS RAFINESQUII				
976	93	75.9	22.3	250.6
1106	6	21.8	18.2	
1107	1	28.3	28.3	
1116	1	37.3	37.3	
1128	6	39.9	31.9	3.9
1143	1	54.9	54.9	3.6
6809	4	28.8	20.4	
6824	3	23.9	16.3	
6829	2	25.2	21.3	
6837	1	28.4	28.4	
6854	1	26.9	26.9	
6855	5	30.0	17.7	
6856	1	24.7	24.7	
6857	1	24.8	24.8	
6858	2	72.2	24.4	
6870	8	73.0	17.8	

6875	2	75.6	18.8	
6890	1	66.1	66.1	
6895	1	81.0	81.0	
6897	12	36.5	18.2	
6900	4	30.3	----	
6905	4	79.9	23.0	
6907	1	32.0	32.0	
6915	5	71.0	16.6	
6920	5	72.6	55.4	
6925	6	28.5	18.6	
6988	10	36.0	24.9	
7002	1	30.7	30.7	
DIAPHUS ROEI				
6856	2	33.8	28.0	
DIAPHUS SPLENDIDUS				
1128	1	31.8	31.8	
DIOGENICHTHYS ATLANTICUS				
1106	1	14.1	14.1	
6885	1	12.2	12.2	
6907	2	20.4	13.2	
ELECTRONA RISSO				
976	4	44.7	28.5	4.8
6915	2	61.6	55.2	
HYGOPHUM BENOITI				
975	1	41.8	41.8	0.9
976	22	48.0	25.0	19.3
1102	40	45.0	24.3	19.4
1103	6	37.6	26.1	2.6
1106	21	46.4	34.3	
1107	7	41.3	36.5	
1108	6	43.2	31.3	7.7
1112	15	43.5	33.3	11.4
1116	7	----	----	
1117	68	44.6	29.9	
1122	1	29.4	29.4	0.4
1123	2	37.4	35.1	1.4
1124	1	37.2	37.2	0.8
1128	2	39.3	22.8	0.9
1129	14	43.7	24.4	5.6
1133	5	30.4	24.8	1.2
1134	3	37.5	36.2	
1138	11	32.4	22.9	2.6
1139	11	32.6	24.4	3.0
1143	8	38.0	28.8	4.0
1144	13	47.8	21.8	7.4
1149	6	43.4	22.6	3.1
6809	8	40.9	30.5	
6829	7	45.9	33.1	
6837	4	49.4	37.5	
6854	12	47.2	30.9	
6858	15	47.0	32.2	
6870	5	39.0	31.1	
6875	7	43.2	28.8	
6885	7	40.4	33.1	
6890	4	43.4	33.0	
6895	2	34.5	27.5	
6897	2	44.1	40.1	
6900	20	43.2	31.0	
6905	3	36.4	30.0	
6907	16	44.9	27.3	
6915	26	42.5	26.7	
6920	12	47.8	31.8	
6925	16	45.0	31.0	
6930	1	31.8	31.8	
6953	1	28.1	28.1	
6960	7	45.0	26.7	
6984	255	49.9	33.2	
6988	242	49.9	34.3	
6994	41	49.7	35.6	
6996	22	51.8	34.6	
7002	4	52.0	42.3	
7004	9	47.2	24.8	
HYGOPHUM HYGOMII				
976	34	59.9	21.5	34.1
1122	1	58.9	58.9	4.0
1123	28	59.8	46.6	60.5
1124	31	57.8	46.6	68.0
1128	19	57.0	23.4	37.8
1129	9	56.2	47.5	18.8
1134	2	50.8	49.9	
1138	1	60.5	60.5	3.5
1143	2	56.8	51.5	5.6
1144	1	49.2	49.2	2.1
6809	3	20.4	19.0	
6829	5	36.2	18.5	
6837	24	53.3	19.1	
6854	57	56.9	17.7	
6858	13	34.3	21.5	
6875	1	19.9	19.9	
6890	1	25.5	25.5	
6897	3	31.4	24.8	
6905	9	29.4	23.0	
6907	8	51.9	18.4	
6915	14	38.9	18.7	
6920	1	24.4	24.4	
6925	3	30.3	22.9	
6984	4	34.5	27.3	
6988	16	35.0	26.0	
7002	1	27.7	27.7	
7004	1	16.7	16.7	
HYGOPHUM REINHARDTII				
1107	2	36.1	33.2	
6858	1	23.8	23.8	
6915	1	30.5	30.5	
HYGOPHUM TAANINGI				
6900	1	24.8	24.8	
LAMPADENA CHAVESI				
1123	1	44.0	44.0	1.0
1129	1	50.3	50.3	1.6
1133	1	52.9	52.9	2.0
LAMPADENA SPECULIGERA				
969	1	123.7	123.7	28.1
971	1	133.2	133.2	36.5
973	1	126.9	126.9	28.5
976	2	33.4	32.1	0.8
6890	1	65.2	65.2	
6900	1	42.6	42.6	
6935	1	59.4	59.4	

6994	1	28.2	28.2	
LAMPADENA	UROPHAOS			
1106	3	46.1	26.1	
1107	2	36.4	29.7	
1108	1	25.5	25.5	0.2
1128	1	30.0	30.0	0.4
6837	9	46.7	29.1	
6854	1	48.0	48.0	
6858	1	34.0	34.0	
6900	1	68.7	68.7	
6960	2	43.6	37.9	
LAMPANYCTUS	ATER			
967	2	96.9	61.3	8.2
969	7	114.2	64.1	39.6
975	4	101.3	84.9	26.0
976	15	108.4	30.0	60.6
1102	15	81.6	25.6	17.2
1106	4	64.2	49.3	
6854	4	61.4	51.8	
6858	1	86.4	86.4	
6900	3	97.4	68.2	
6915	6	102.1	26.2	
6925	1	60.5	60.5	
6998	2	66.0	62.4	
LAMPANYCTUS	CROCODILUS			
969	1	37.9	37.9	0.4
970	1	32.8	32.8	0.4
975	1	178.1	178.1	52.5
976	11	83.8	33.5	21.2
1106	20	63.5	34.8	
1107	1	50.2	50.2	
1108	15	56.7	35.5	13.6
1128	14	61.2	25.7	9.7
6854	1	58.3	58.3	
6858	1	180.0	180.0	
6875	1	106.0	106.0	
6880	2	82.4	59.1	
6885	1	73.7	73.7	
6905	1	107.0	107.0	
6920	1	103.4	103.4	
6935	2	99.2	73.0	
6946	4	102.2	72.0	
6956	3	114.8	54.5	
6960	11	83.0	55.8	
6994	2	62.9	51.3	
6996	2	61.3	58.2	
7002	4	67.0	48.8	
LAMPANYCTUS	FESTIVUS			
1106	3	44.6	41.8	
1112	2	53.1	51.3	2.4
6829	1	56.4	56.4	
6837	4	59.9	44.5	
6875	1	67.8	67.8	
6900	3	70.3	53.9	
6915	2	96.3	88.9	
6925	1	63.7	63.7	
7004	1	47.0	47.0	
LAMPANYCTUS	LINEATUS			
1103	1	76.7	76.7	2.3
1112	1	70.9	70.9	2.0
6854	1	113.3	113.3	
6858	2	62.8	50.7	
LAMPANYCTUS	MACDONALDI			
967	1	113.2	113.2	15.1
969	3	131.6	36.0	39.3
971	8	147.0	69.7	135.0
973	4	137.8	84.9	77.8
6925	1	115.8	115.8	
6946	2	100.7	94.0	
LAMPANYCTUS	PHOTONOTUS			
1103	6	38.7	29.1	1.6
1106	36	----	----	
1107	18	52.6	36.0	
1108	7	58.1	35.1	5.2
1112	1	29.9	29.9	0.2
1122	10	54.7	24.2	4.2
1123	2	59.4	29.6	2.1
1129	13	57.3	20.0	4.0
1133	1	26.1	26.1	0.1
1138	4	31.3	26.1	0.6
1139	14	41.7	24.1	3.7
1143	1	27.3	27.3	0.2
1144	1	37.9	37.9	0.4
6837	18	52.9	28.4	
6854	15	56.7	36.2	
6858	4	43.2	34.7	
6875	2	45.4	33.7	
6897	6	40.7	34.3	
6900	3	61.2	31.2	
6907	5	35.5	31.2	
6915	14	61.8	29.4	
6920	2	31.3	29.1	
6925	1	33.4	33.4	
6930	1	78.0	78.0	
6946	1	34.1	34.1	
6994	1	66.1	66.1	
6996	2	46.7	41.3	
7002	6	45.8	33.1	
7004	5	48.1	34.3	
LAMPANYCTUS	PUSILLUS			
1106	85	----	----	
1107	3	46.2	34.6	
1108	39	45.1	27.1	11.6
1112	4	30.8	27.2	0.8
1116	2	30.9	30.5	
1117	2	34.4	32.8	
1123	4	29.4	26.6	0.7
1124	2	30.2	29.1	0.5
1133	16	33.1	23.4	2.8
1134	2	31.7	25.5	
1139	8	40.3	23.8	2.0
1143	1	32.8	32.8	0.3
6829	1	30.3	30.3	
6837	56	37.8	28.4	
6854	34	37.6	22.7	
6858	7	35.3	28.4	
6875	7	34.4	25.1	
6885	1	31.3	31.3	

6895	13	35.2	27.8	
6897	12	34.3	31.3	
6905	3	33.4	30.3	
6907	48	33.9	28.4	
6915	29	40.0	19.3	
6953	6	36.2	26.2	
6960	15	36.7	26.4	
6988	3	35.4	31.2	
6996	1	32.0	32.0	
7002	6	35.7	29.8	
7004	10	35.9	30.2	
LEPIDOPHANES		GAUSSI		
1123	3	40.5	36.8	1.2
1124	4	37.8	31.4	1.4
1134	5	43.6	35.9	
6829	1	29.4	29.4	
6837	3	----	----	
6854	5	37.8	27.2	
6858	1	29.6	29.6	
6897	2	39.5	30.1	
6915	3	41.8	30.3	
7002	2	37.6	33.5	
LEPIDOPHANES		GUENTHERI		
976	1	23.7	23.7	0.1
1103	2	32.9	32.0	0.5
1106	6	58.4	37.1	
1107	7	60.6	46.7	
1108	15	63.4	27.3	16.0
1112	10	56.0	30.3	7.1
1116	2	51.7	47.9	
1117	3	42.6	36.3	
1122	2	56.1	47.0	3.2
1123	7	57.2	42.4	7.4
1124	3	58.4	51.8	4.2
1128	7	57.8	21.8	4.0
1129	1	62.1	62.1	1.8
1133	4	59.2	30.5	3.3
1134	3	57.0	43.6	
1138	5	56.8	37.4	4.4
1139	7	58.1	29.2	6.3
1143	1	53.5	53.5	1.4
1144	11	60.8	48.6	15.6
1149	2	46.8	38.8	1.4
6837	5	----	----	
6854	17	46.4	35.9	
6858	4	43.4	28.3	
6875	3	39.3	33.4	
6880	1	57.2	57.2	
6895	2	45.0	37.5	
6905	1	31.0	31.0	
6907	3	59.3	45.6	
6915	5	53.8	37.9	
6925	3	45.5	36.2	
6930	2	48.5	36.9	
6960	2	56.9	41.5	
6988	7	52.5	26.6	
LOBIANCHIA		DOFLEINI		
976	291	42.6	24.2	193.8
1102	1	28.6	28.6	0.4
1106	4	29.2	26.8	
1107	2	34.3	31.1	
1108	6	35.2	26.5	2.7
1122	4	31.1	27.4	2.1
1123	2	28.1	26.2	0.6
1124	1	25.3	25.3	0.3
1128	3	28.5	27.9	1.1
1129	2	29.6	27.8	0.7
1133	2	28.2	25.2	0.6
1138	8	29.0	27.4	2.8
1139	9	30.9	25.9	3.1
1143	5	29.8	27.4	2.0
1144	2	28.4	28.0	0.7
6824	3	30.9	29.2	
6837	75	33.8	26.7	
6854	40	35.7	27.2	
6855	39	31.5	27.0	
6856	42	32.2	27.0	
6857	41	47.4	25.6	
6858	21	36.2	21.1	
6890	1	30.1	30.1	
6897	5	30.4	27.3	
6900	3	28.3	28.0	
6907	34	34.6	25.9	
6915	44	35.2	26.8	
6925	1	15.0	15.0	
6984	2	35.5	32.5	
6988	23	32.9	27.3	
7002	1	32.9	32.9	
LOBIANCHIA		GEMELLARII		
975	4	103.0	87.6	64.1
976	19	93.6	56.1	90.8
1106	1	38.2	38.2	
1107	2	49.1	33.8	
1128	1	16.4	16.4	0.1
6837	7	19.2	14.3	
6858	2	22.8	21.7	
6870	5	91.3	67.5	
6875	1	88.4	88.4	
6885	7	83.8	48.5	
6890	2	68.1	53.7	
6895	4	82.6	61.7	
6900	1	60.4	60.4	
6905	2	93.2	89.0	
6907	2	22.2	20.9	
6915	2	72.2	66.3	
6920	3	92.3	46.3	
6925	4	71.4	54.2	
6930	1	51.4	51.4	
6960	15	67.7	24.0	
MYCTOPHUM		OBTUSIROSTRE		
1138	1	28.4	28.4	0.3
MYCTOPHUM		PUNCTATUM		
970	1	62.1	62.1	3.3
972	3	86.6	74.4	20.2
973	2	69.1	68.1	9.2
975	5	86.8	22.5	24.1
976	4	68.3	17.4	4.8
1103	2	81.6	78.4	16.1

1106	22	76.6	51.8	
1107	27	75.4	55.3	
1108	23	79.9	52.7	99.9
1112	9	80.1	57.4	42.3
1116	6	75.6	70.1	36.8
1117	3	74.3	69.1	
1129	1	72.7	72.7	4.2
6870	4	69.3	60.0	
6875	3	72.4	58.5	
6880	1	61.2	61.2	
6885	2	74.1	68.0	
6890	4	77.1	54.3	
6895	2	61.2	59.2	
6930	8	74.8	55.4	
6956	1	62.8	62.8	
6984	1	62.9	62.9	
6994	2	79.5	64.4	
6996	19	83.5	63.5	
7002	10	83.9	66.3	
7004	3	61.2	22.7	
MYCTOPHUM	SELENOPS			
1107	1	26.0	26.0	
1108	1	54.8	54.8	3.4
6824	3	26.9	16.7	
6837	2	26.6	20.3	
6854	3	42.3	18.9	
6855	1	12.0	12.0	
6856	1	38.9	38.9	
6858	1	34.6	34.6	
NOTOSCOPELUS	BOLINI			
976	98	91.5	21.1	185.1
1106	7	78.8	63.9	
1107	1	75.6	75.6	
6988	13	83.4	22.5	
6994	2	82.1	81.3	
6996	1	93.1	93.1	
NOTOSCOPELUS	CAUDISPINOSUS			
1112	3	41.0	37.6	1.9
1117	1	33.6	33.6	
1124	1	25.0	25.0	0.1
1128	1	25.9	25.9	0.2
1129	2	109.0	77.1	19.8
1134	1	81.1	81.1	
1138	1	28.7	28.7	0.2
1139	1	24.1	24.1	0.1
6829	7	35.6	23.3	
6837	47	44.8	21.1	
6854	67	46.7	19.9	
6858	7	40.7	21.9	
6900	4	38.4	32.7	
6915	10	57.4	22.2	
6920	2	36.9	34.7	
6925	1	32.4	32.4	
6960	1	31.7	31.7	
6984	2	35.8	22.4	
NOTOSCOPELUS	ELONGATUS			
967	1	109.7	109.7	14.0
969	1	59.0	59.0	1.8
975	1	100.0	100.0	11.5
6907	1	23.1	23.1	
7002	27	24.9	19.8	
7004	19	94.3	22.7	
NOTOSCOPELUS	RESPLENDENS			
1103	1	24.8	24.8	2.1
1122	4	58.5	54.9	9.7
1123	13	59.4	51.9	23.1
1124	4	57.6	53.9	7.4
1128	6	56.3	52.6	10.1
1129	7	60.6	55.5	13.9
1133	1	57.7	57.7	2.2
1134	3	58.4	51.4	
1138	2	58.7	54.8	3.5
6837	7	67.9	56.8	
6854	7	75.3	55.8	
6858	3	65.9	55.9	
6897	2	73.3	64.5	
6996	2	29.3	26.7	
PROTOMYCTOPHUM	ARCTICUM			
966	1	42.2	42.2	1.2
967	27	43.8	32.6	12.9
968	1	46.0	46.0	1.3
969	13	44.7	37.5	13.0
970	78	45.7	33.1	74.6
971	32	46.2	34.9	32.6
972	14	44.7	31.7	13.4
973	26	46.3	31.8	27.8
974	5	45.2	39.3	4.7
975	2	46.6	38.8	2.1
6870	1	29.1	29.1	
6880	1	28.1	28.1	
6895	1	29.7	29.7	
6925	2	36.9	23.8	
6935	1	36.2	36.2	
6940	2	34.4	31.6	
6951	21	43.9	27.3	
6956	2	38.1	32.1	
SYMBOLOPHORUS	VERANYI			
976	11	55.2	29.9	10.8
1133	1	25.9	25.9	0.1
6875	8	31.2	23.6	
6880	2	29.3	26.7	
6885	2	50.4	37.7	
6890	6	33.5	27.9	
6895	15	37.0	25.7	
6897	1	28.8	28.8	
6905	1	26.9	26.9	
6907	2	32.7	24.2	
6920	1	35.0	35.0	
6925	2	43.8	29.1	
6935	3	28.1	23.8	
6940	1	26.6	26.6	
6946	8	37.8	24.9	
6951	3	----	----	
6953	17	31.4	24.9	
6956	6	29.2	23.2	
6984	12	97.2	27.3	
6988	5	70.6	33.8	
6994	7	38.4	22.9	

6996	2	30.4	28.8	
7002	1	32.5	32.5	
7004	5	39.5	33.3	
TAANINGICHTHYS BATHYPHILUS				
971	1	64.2	64.2	
TAANINGICHTHYS MINIMUS				
976	1	40.6	40.6	0.7
1106	1	25.8	25.8	
6854	3	28.2	23.9	
6905	2	33.7	26.7	
6915	1	35.7	35.7	
6920	1	34.2	34.2	
NEMICHTHYIDAE				
LABICHTHYS CARINATUS				
969	1	426.0	426.0	9.9
NEMICHTHYS SCOLOPACEUS				
967	1	744.0	744.0	14.1
968	1	860.0	860.0	18.3
973	1	746.0	746.0	17.1
6925	1	----	----	
6994	2	----	----	
7002	1	587.0	587.0	
7004	2	----	----	
NESSORHAMPHIDAE				
NESSORHAMPHUS INGOLFIANUS				
969	1	450.0	450.0	
NETTASTOMIATIDAE				
HOPLUNNIS SP				
6809	1	----	----	
NOMEIDAE				
CUBICEPS GRACILIS				
976	8	42.2	25.6	6.6
6855	1	19.4	19.4	
7004	3	45.7	40.8	
ONEIRODIDAE				
CHAENOPHRYNE DRACO				
975	1	37.0	37.0	
DOLOPICHTHYS PULLATUS				
969	1	35.0	35.0	
973	1	47.0	47.0	
LOPHODOLOS ACANTHOGNATHUS				
973	1	16.0	16.0	
ONEIRODES ESCHRICHTI				
973	1	11.7	11.7	0.1
ONEIRODES SCHMIDTI				
971	1	95.6	95.6	61.6
OPISTHOPROCTIDAE				
DOLICHOPTERYS BINOCULARIS				
6885	1	100.0	100.0	
OPISTHOPROCTUS SOLEATUS				
6900	1	48.0	48.0	
PARALEPIDAE				
NOTOLEPIS RISSOI				
967	1	251.9	251.9	23.6
969	5	246.5	41.7	27.4
970	1	40.2	40.2	0.2
972	1	114.1	114.1	1.5
973	3	112.4	62.7	1.3
975	6	151.1	31.4	6.9
976	6	147.5	69.1	6.6
6854	1	90.1	90.1	
6875	10	105.7	52.7	
6880	5	91.4	36.2	
6895	4	49.9	41.1	
6905	1	70.0	70.0	
6925	1	38.4	38.4	
6930	3	76.6	46.8	
6935	10	101.3	46.2	
6940	4	92.4	75.2	
6946	14	89.0	49.9	
6951	1	79.9	79.9	
6960	4	44.5	34.5	
6998	2	111.3	108.5	
PARALEPIS SP				
6946	1	54.7	54.7	
SACCOPHARYNGIDAE				
SACCOPHARYNX AMPULLACEUS				
973	1	519.0	519.0	10.2
SCOMBERESOCIDAE				
SCOMBERESOX SAURUS				
976	1	151.3	151.3	7.9
SCOPELARCHIDAE				
BENTHALBELLA INFANS				
6858	1	----	----	
SCOPELOSAURIDAE				
SCOPELOSAURUS ARGENTEUS				
6890	1	39.7	39.7	
6960	1	38.0	38.0	
SCOPELOSAURUS MAULI				
1106	44	59.7	40.3	
1107	23	61.1	44.3	
6837	7	56.0	35.9	
6854	1	39.1	39.1	
6915	1	41.2	41.2	
SEARSIDAE				
NORMICHTHYS OPEROSA				
971	1	56.2	56.2	1.5
973	1	133.0	133.0	31.6
975	1	40.0	40.0	
SERRIVOMERIDAE				
SERRIVOMER BEANI				
967	1	502.0	502.0	16.2
969	2	565.0	438.0	58.6
970	4	500.0	290.4	47.7
971	17	775.0	292.0	859.7

972	4	685.0	257.0	155.7
973	13	631.0	223.0	341.8
974	5	362.0	277.0	16.0
975	6	407.0	284.0	35.5
976	3	158.0	158.0	
6875	7	375.0	177.0	
6880	1	191.0	191.0	
6885	1	196.0	196.0	
6895	1	203.0	203.0	
6925	3	367.0	220.0	
6930	2	350.0	203.0	
6935	6	327.0	230.0	
6940	2	550.0	541.0	
6946	1	241.0	241.0	
6951	2	350.0	291.0	
6956	4	----	----	
6960	1	171.0	171.0	
SERRIVOMER BREVIDENTATUS				
6900	1	155.0	155.0	
6915	1	169.0	169.0	
6915	1	----	----	
SQUALIDAE				
SQUALIOLUS LATICAUDUS				
1122	1	103.4	103.4	
6856	2	164.2	149.6	
STERNOPTYCHIDAE				
ARGYROPELECUS ACULEATUS				
974	1	19.0	19.0	0.2
1106	2	18.9	15.9	
1107	2	31.6	17.2	
6809	2	32.2	26.4	
6814	2	58.8	18.8	
6824	3	41.6	11.6	
6829	1	24.9	24.9	
6854	1	59.6	59.6	
6855	6	63.7	23.6	
6856	3	54.8	29.8	
6857	6	64.2	10.7	
6858	1	40.0	40.0	
6870	4	37.0	22.5	
6875	3	18.2	13.3	
6885	2	40.3	28.8	
6900	6	49.2	15.8	
6905	1	29.5	29.5	
6915	6	55.6	17.7	
6925	2	31.9	27.9	
6930	1	13.0	13.0	
6960	4	48.4	12.8	
6994	1	----	----	
ARGYROPELECUS AFFINIS				
6858	1	26.7	26.7	
6875	1	19.7	19.7	
ARGYROPELECUS HEMIGYMNUS				
976	4	30.9	20.2	2.6
6809	6	27.9	17.6	
6814	12	31.0	16.3	
6824	4	21.4	14.7	
6829	1	18.3	18.3	
6854	8	28.5	15.2	
6855	16	28.8	11.7	
6856	13	28.2	9.8	
6857	6	21.3	12.3	
6858	4	26.5	15.1	
6870	1	25.8	25.8	
6875	4	28.0	20.8	
6885	2	30.8	27.7	
6890	5	29.2	16.6	
6900	8	28.1	18.1	
6905	4	31.5	13.7	
6915	3	28.7	20.0	
6920	1	22.3	22.3	
6925	7	33.2	24.9	
6930	2	36.6	14.8	
6946	1	22.8	22.8	
6960	13	41.0	16.7	
7002	2	----	----	
ARGYROPELECUS OLFERSI				
976	1	73.5	73.5	15.6
POLYIPNUS ASTEROIDES				
6809	2	19.2	14.6	
6814	1	17.3	17.3	
STERNOPTYX DIAPHANA				
969	4	29.0	22.3	5.2
970	1	31.5	31.5	1.6
975	15	36.5	15.7	23.7
976	1	13.7	13.7	0.1
1102	1	24.2	24.2	0.7
6809	2	15.9	9.4	
6829	4	13.0	9.9	
6858	5	29.2	11.8	
6875	2	16.0	15.4	
6890	2	17.6	16.2	
6900	1	15.6	15.6	
6905	1	12.8	12.8	
6915	2	20.8	10.5	
6920	2	23.1	10.0	
6925	4	25.9	11.0	
6930	9	21.2	11.9	
6935	1	31.4	31.4	
6940	9	23.2	11.9	
6946	2	29.4	9.2	
6951	2	25.0	17.3	
6956	5	26.4	14.0	
6960	1	26.4	26.4	
STOMIATIDAE				
STOMIAS BOA FEROX				
967	104	233.5	96.3	1038.9
968	27	237.2	108.1	199.2
969	42	283.3	119.5	722.2
970	12	191.5	98.2	107.1
971	41	261.4	92.9	754.2
972	19	261.6	95.4	261.8
973	17	247.7	101.7	186.3
974	6	215.1	92.7	42.1
975	12	286.7	102.7	286.4

976	11	232.0	114.1	133.0
1106	1	162.0	162.0	
1107	1	156.0	156.0	
1108	1	200.5	200.5	14.7
6837	3	75.1	59.0	
6880	1	164.0	164.0	
6900	4	262.0	106.3	
6925	1	242.0	242.0	
6930	1	80.1	80.1	
6935	1	93.1	93.1	
6940	4	227.0	87.3	
6946	2	236.0	97.0	
6951	5	256.0	111.0	
6956	1	102.8	102.8	
6988	2	142.5	118.9	
6994	3	123.5	60.3	
6996	1	88.0	88.0	
7002	1	36.0	36.0	
7004	2	180.0	80.7	
TETRADONTIDAE				
SPHOEROIDES SP				
6829	1	----	----	
6875	1	18.3	18.3	
TRICHIURIDAE				
APHANOPHOS CARBO				
1107	2	----	----	
1108	1	157.9	157.9	16.0
1116	2	148.1	139.6	27.2
1117	1	----	----	
1143	1	116.5	116.5	7.5
1149	1	136.9	136.9	13.3
6870	1	73.1	73.1	
6925	2	----	----	
BENTHODESMUS SP				
6960	1	113.2	113.2	

Table 3. Number of species in the major families for each of the three areas

Family	Number of species		
	Newfoundland Basin	Slope Water	Gulf Stream
Myctophidae	14	39	29
Bathylagidae	1	4	3
Stomiatidae	1	1	1
Chauliodontidae	1	2	1
Gonostomatidae	3	13	5
Melamphaidae	3	6	1
Melanostomiatidae	1	4	5
Sternoptychidae	2	5	2
Scopelosauridae	0	2	1
Diretmidae	1	1	1
Paralepididae	1	1	1
Total	28	79	50

Table 4. Most abundant species from each of the three areas. Only the top eight species were ranked; entries are rank orders. + indicates present; - indicates absent.

	Newfoundland Basin	Slope Water	Gulf Stream
Bathylagus euryops	4	+	-
Benthosema glaciale	1	1	5
Bolinichthys indicus	+	6	+
Ceratoscopelus maderensis	7	2	1
Ceratoscopelus warmingii	-	+	3
Chauliodus sloani	6	+	+
Cyclothone microdon	5	+	-
Diaphus mollis	-	+	8
Gonostoma elongatum	+	7	+
Hygophum benoiti	+	3	2
Hygophum hygomii	-	+	4
Lampanyctus pusillus	-	5	7
Lepidophanes guentheri	-	+	6
Lobianchia dofleini	-	4	+
Notolepis rissoi	8	+	-
Protomyctophum arcticum	3	+	-
Stomias boa ferox	2	+	+
Vinciguerria attenuata	-	8	+

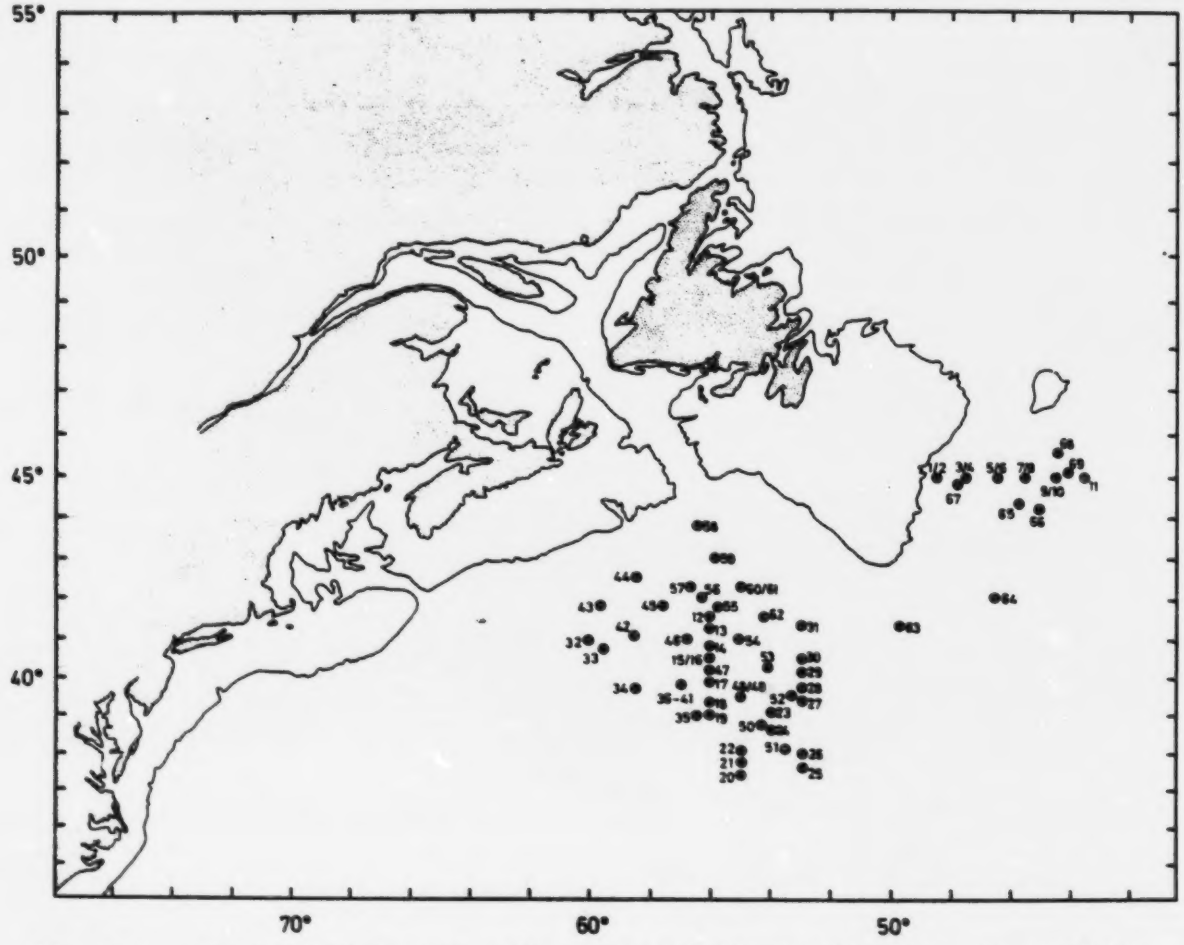

Figure 1. Chart of study area with sample locations indicated. See Table 1.

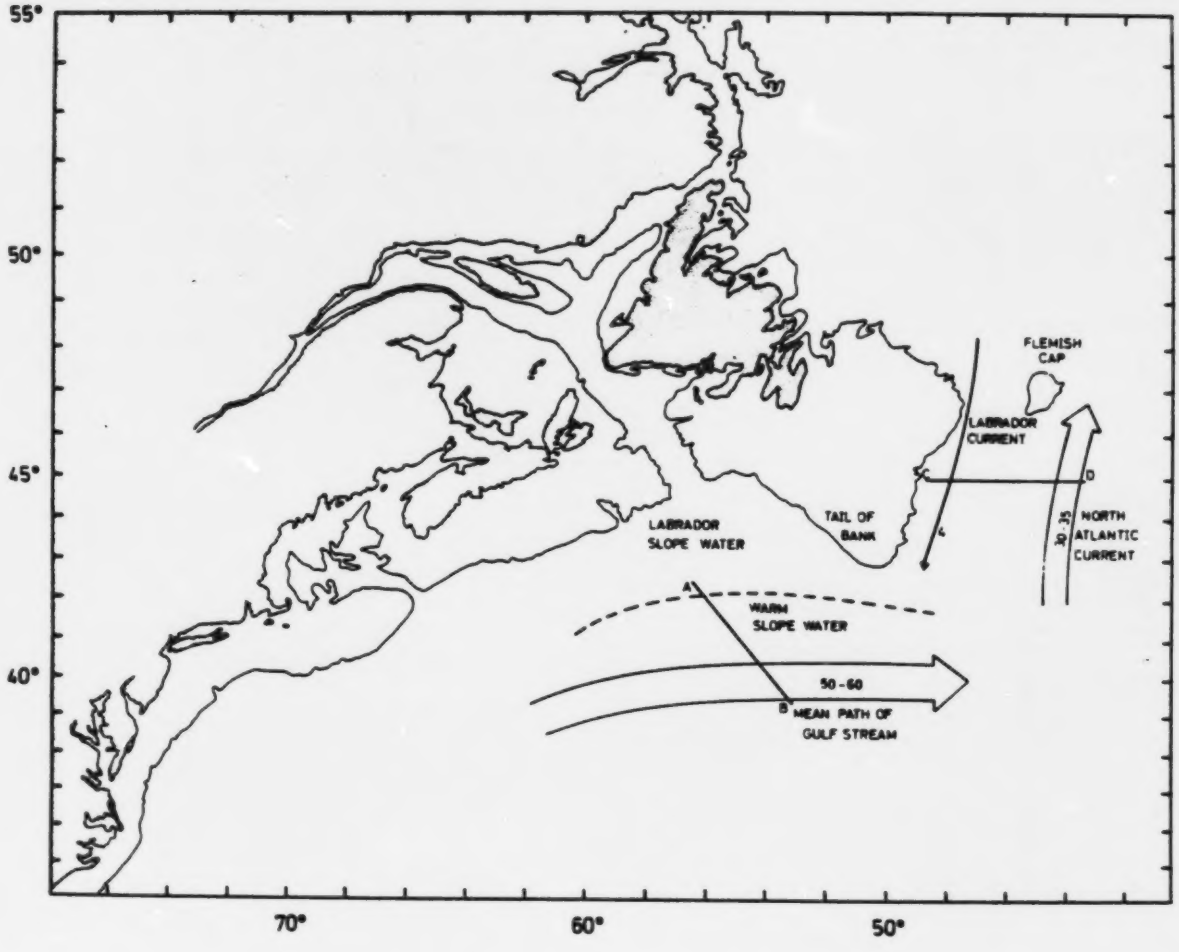

Figure 2. Chart of study area showing major current systems and features referred to in the text. Thickness of arrow is proportional to relative volume transport (values indicated are Sverdrups). Locations of the two hydrographic transects A-B and C-D are indicated.

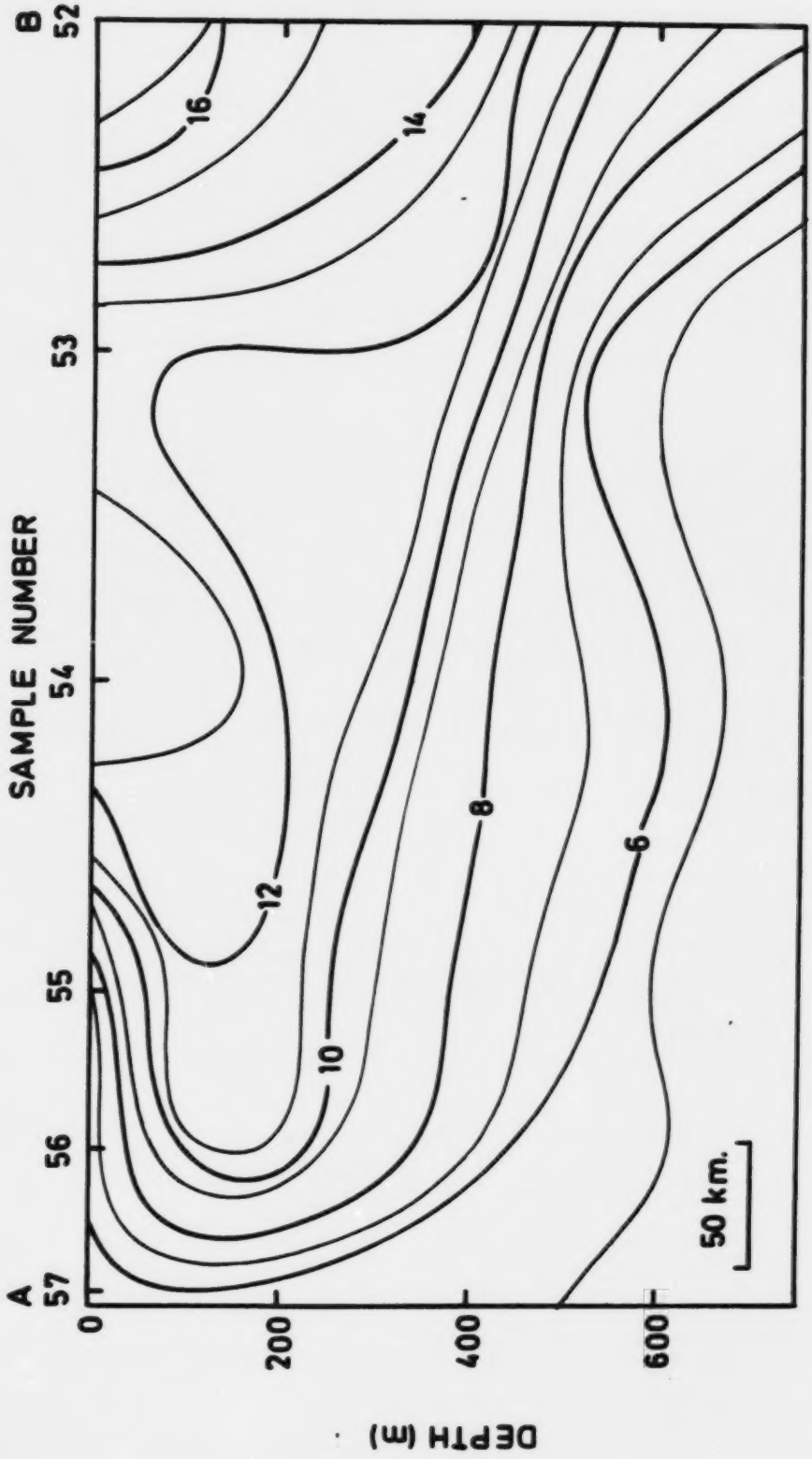

Figure 3. Temperature profile along the transect A-B across the Gulf Stream. Data from Belogorsk 79-03. Contour interval is 1°C.

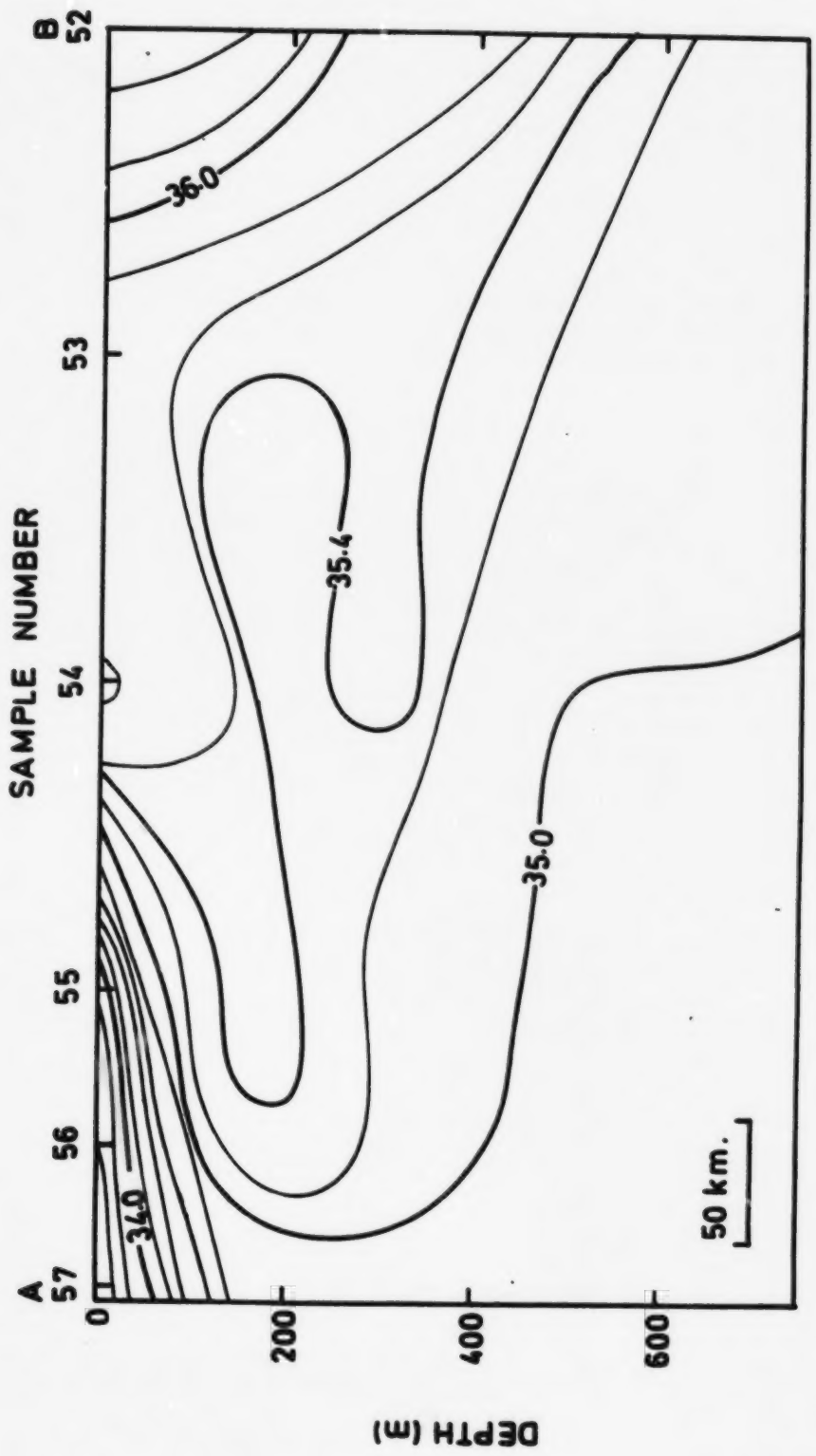

Figure 4. Salinity profile along the transect A-B across the Gulf Stream. Data from Belogorsk 79-03. Contour interval is 0.2 ppt.

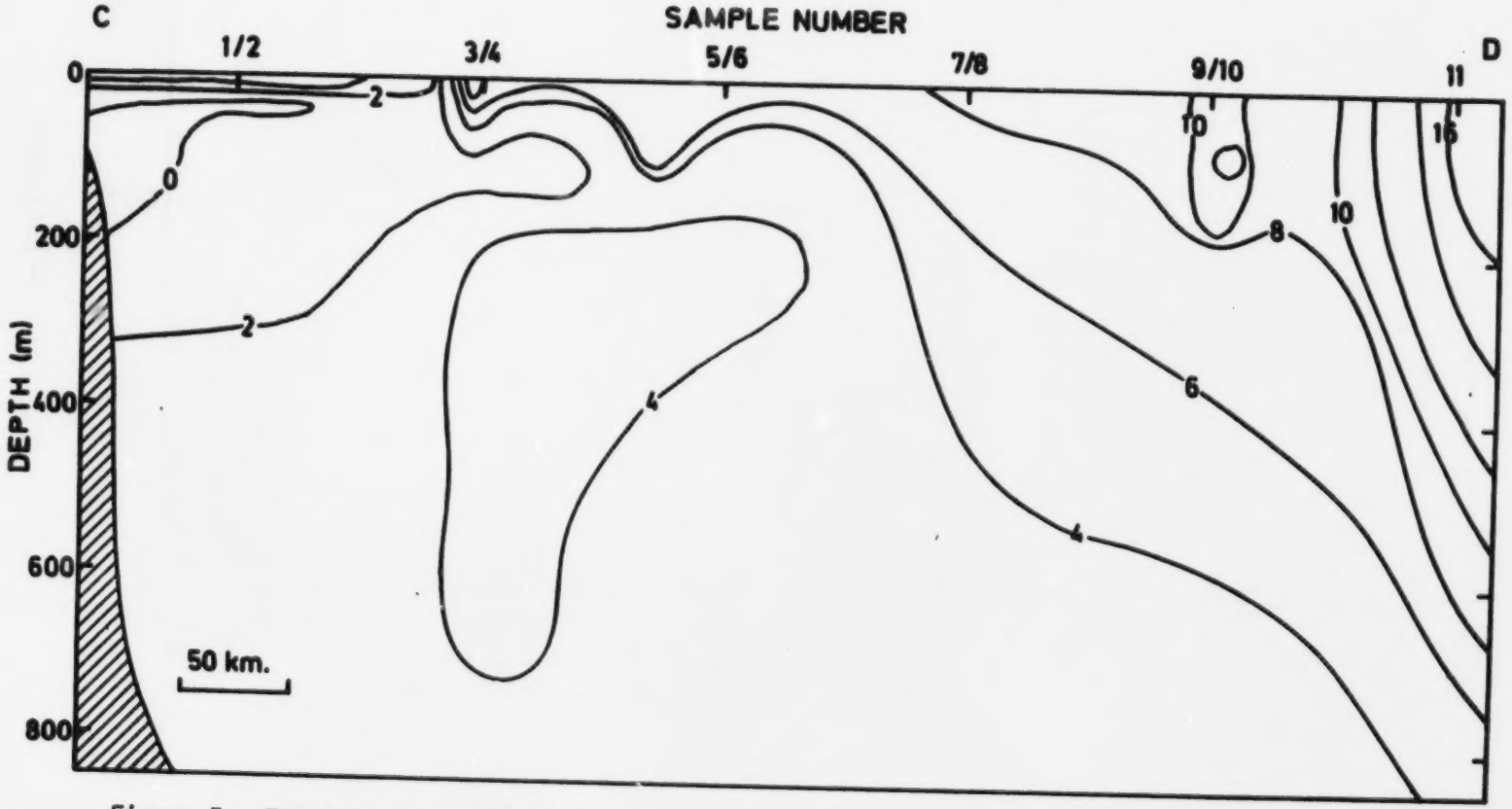

Figure 5. Temperature profile along the transect C-D across the Labrador Current. Data from Gadus Atlantica 51. Contour interval is 2°C.

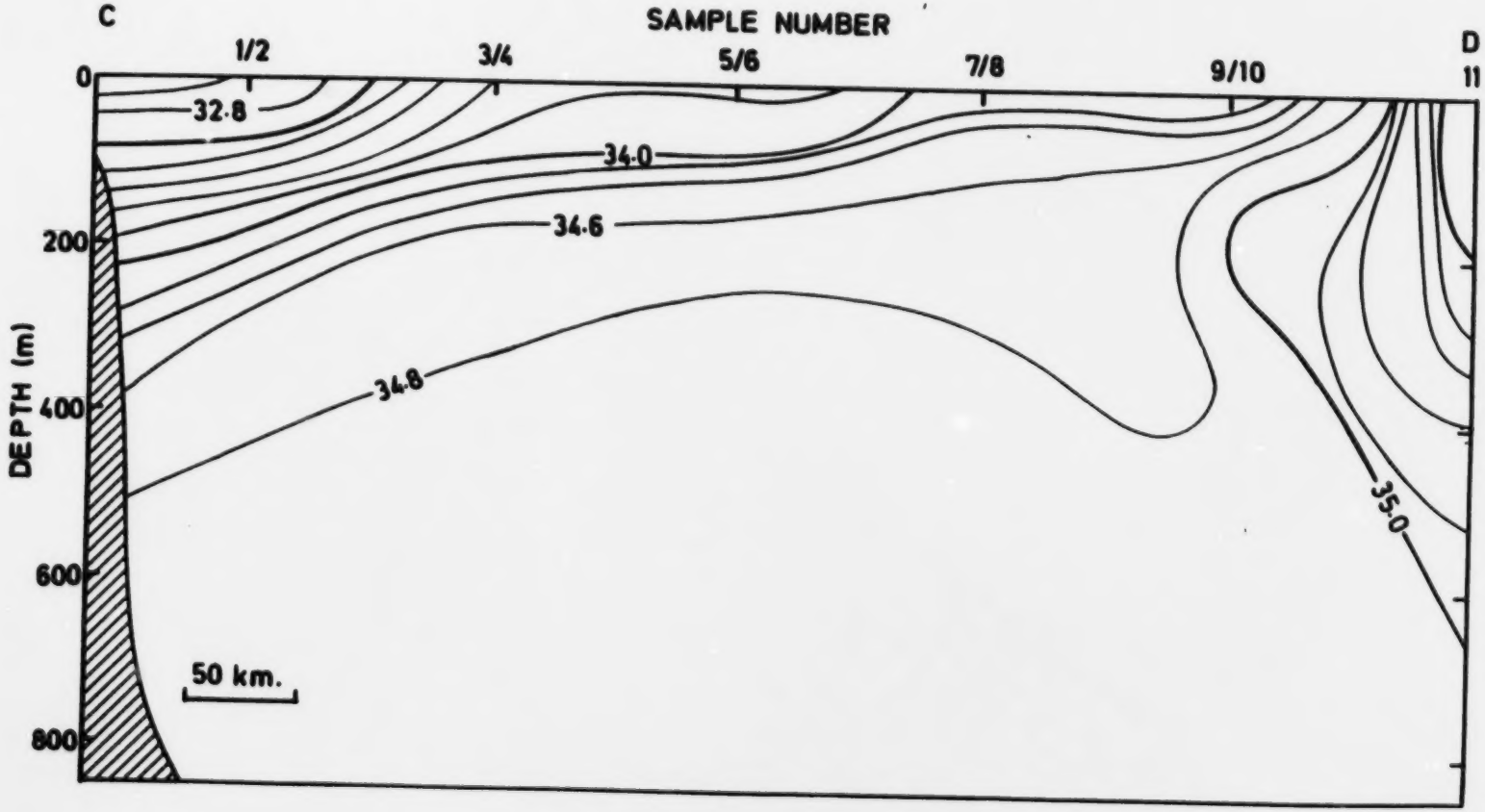

Figure 6. Salinity profile along the transect C-D across the Labrador Current. Data from Gadus Atlantica 51. Contour interval is 0.2 ppt.